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Editorial.

THIS number of the *London Naturalist* is a slimmer volume than usual, though it reflects fully the varied interests of the Society. Apart from the formal reports at the end of the volume, it consists almost wholly of the results of the active work being done by the Society. The major contributions are made by the Botanical, Ecological and Geological sections. A start is made in this number with the publication of the revised handlist of the plants of the London area; this is an important undertaking, long projected and laboriously accomplished, and its value not only to members of the Society but to all London botanists will be evident. The geologists have provided a further instalment of their reports on temporary geological sections. The Ecological section continues its series of reports on the surveys at Bookham and on the Cripplegate bombed site. But the entomologists are this year taking breath after producing since the war reports on the Thysanoptera, dragonflies and butterflies of our area.

All this, at least in the Editor's opinion, is as it should be. Although the *London Naturalist* has often published, and will continue to publish, papers of general interest by members or given to the Society by eminent naturalists, its primary functions are to record the work which is being done by the Society, and to provide a means of publication for individual members whose work is relevant to the objects of the Society.

The character of the *London Naturalist* is, therefore, bound to reflect the character and functions of the Society. Two of the most important characteristics of the Society are its permanence and its multiplicity. Naturalists come and go, but the Society goes on, if not for ever, at least for considerably more than the normal span of human life. The days are past when one man could take all knowledge for his realm; but in our society there are specialists in many branches who can produce the answers which the individual would seek in vain. Again the individual naturalist, not being a bird, cannot be in two places at the same time; the Society, through its members, can. It is possible, therefore, for the Society to make wide surveys of the whole of its area; to carry on for long periods more detailed studies of particular areas or subjects; and to engage on projects which require the co-operation of students of many branches of natural history. All of these activities would be beyond the capacity of any individual.

Examples of the ways in which the Society is discharging these functions are to be found in our pages, either in the published papers or in the sectional reports. Thus the Botanical, Geological and Entomological sections are engaged in the necessary task of recording the present facts about our area. Information about the geology, and about the distribution and status of the plants and animals forms an essential background to any detailed study. One way of studying the changes resulting from the urbanisation and suburbanisation of increasing areas of London is by recording the facts as they now are. Something has already been done, but much remains to be done, and the process can never be completed. In particular, comparatively little is yet known of the insects and almost nothing of the other arthropods of our area, though individual members and other naturalists must have a great deal of information if only they would make it available. It is a commonplace that our knowledge of the past natural history of this country is fragmentary and unsatisfactory. The least we can do, as a local society, is to ensure that future naturalists shall have less reason to reproach their predecessors. We can do this mainly by recording the natural history of our area. Another important, but often overlooked, function of local societies is to receive and preserve the notebooks and collections of their members. Much useful knowledge is lost when the notebooks, libraries and collections of deceased naturalists pass into the hands of persons with no interest in natural history. Although it would hardly be true at present to suggest that the Society would welcome additional collections, members could at least ensure that on their deaths their notebooks go to the Society—and that during their lives those notebooks are kept, and indexed, in such a way as to make them intelligible to other people!

The preservation for posterity and for ourselves of the most interesting natural habitats which still remain in and around London is an object which concerns every London naturalist. For this purpose also the work of recording the present fauna and flora of such areas is vitally important, to enable the Society to justify any claims they may make for the preservation of particular areas. This task is being organised by the Society's nature conservation committee, whose secretary, Mr C. P. Castell, needs the assistance of every member of the Society who is willing to study and record the special features of any area which he visits regularly.

Another promising subject for study, which has received very little attention except from the ornithologists and the botanists, is the effect of the conditions in London on the habits and habitats of its fauna and flora. Everyone is familiar with the gulls of London, with its starling roosts, and the ducks in the parks. We know, too, that the bombed areas in the City have been invaded by certain species of plants and insects, though it is clear that the communities in those areas are still changing rapidly. But we know little of the effects which life in London, with its warmth and shelter and its high atmospheric pollution, has had on these invaders or on those well established inhabitants which have for long existed in its parks and squares or in its buildings. Every year the Editor appeals to members for short notes; this year he makes that appeal more specific, and asks particularly for notes on habits and habitats peculiar to London or having special relevance to London's conditions. Many matters of this kind, which ought to be permanently recorded, are mentioned as communications at sectional and general meetings. There are nearly always a few odd corners and half pages in the *London Naturalist* which could usefully be filled by notes of this kind, and sectional secretaries would be doing a service to the Society and a kindness to the Editor if they would search their minute books for notes suitable for publication.

Botanical Records for 1950.

Compiled by J. Edward Lousley.

THE botanists of the London Area carried out their field work in 1950 under climatic conditions so inclement that some falling off from the standard reported here over the last eight years might have been expected. July, August and September were unsettled and wet; ditches, canals and ponds were overfull, with the notable exception of the Aldenham Reservoir, which was maintained at an artificially low level so that there was some strand vegetation. *Carex vulpinoidea,* which was discovered at Tadworth in a dry grassy hollow in June, was standing in over six inches of water in July. Warmth-loving aliens were not encouraged to germinate. But in spite of the weather the records submitted were quite as numerous and interesting as in previous seasons. They are arranged as usual in the sequence of Watsonian vice-counties:—

V.-c. 16, West Kent.

R. A. Boniface has again made some interesting records from this vice-county. In a chalk-pit at Greenhithe he found *Lathyrus Aphaca* L.; from Lessness Abbey Woods he records ×*Luzula Borreri* (Bromfield) which is a hybrid between two Woodrushes, *L. Forsteri* (Sm.) DC. and *L. pilosa* (L.) Willd.; in Farningham Wood he noted *Tilia cordata* Mill, *Neottia nidus-avis* (L.) Rich and *Saxifraga granulata* L., and near Farningham Road Station, *Nepeta Cataria* L. An extensive colony of *Ophioglossum vulgatum* L. and a single plant of *Orchis Morio* L. were found by J. S. S. Beesley on waste land between Hayes and Beckenham.

The fields dressed with shoddy near Hextable (see *L.N., No. 28,* 27, and *No. 29,* 9) were again rather disappointing though some of the aliens of Australian origin appeared once more. In September D. McClintock noted *Xanthium spinosum* L., *Medicago praecox* DC., *M. hispida* Gaertn., *M. minima* (L.) Bartol., *Erodium cygnorum* Nees, *E. Botrys* (Cav.) Bert. and *Chenopodium cristatum* (F. Muell.) F. Muell. (det. J. P. M. Brenan). From the same fields he reported *Galinsoga parviflora* Cav. which is still extending its ground in our area.

V.-c. 17, Surrey.

One of the few compensations of a wet summer was the magnificent display of *Teucrium Botrys* L. in the Chipstead Valley. In a chalky field allowed to revert after cultivation during the war, tens of thousands of luxuriant plants, often a foot in height, intermixed with great colonies of *Echium vulgare* L., afforded a sight which it would have been worth going a very long way to see. I have known Cut-leaved Germander here since 1924 and have seen it wane and increase many times but the best of previous displays was far inferior to the grand show of 1950. *Ajuga Chamaepitys* (L.) Schreb. growing with it was also exceptionally fine and plentiful.

In June, C. T. Prime sent me a sedge for identification which he had gathered in a hollow on Banstead Heath, Tadworth, and this proved to be *Carex vulpinoidea* Michaux. This North American species has been included in British floras and found on at least three previous occasions within the London Area (Acton, A. Loydell, 1907; Kew, G. Nicholson, 1880, and Farnborough, W. Kent, Lousley, 1937)—see Lousley, *B.E.C. 1937 Rep.*, 459. In the new locality it was growing in some quantity under very natural conditions and it seems likely that it has been there for some years and may well persist. The sedge may have been introduced by Canadian or U.S.A. troops during the war. Several members visited the locality during the summer.

On the day in July when Mr. Prime showed me *Carex vulpinoidea* we made several other interesting records. A cornfield near Kingswood station had *Galeopsis speciosa* Mill., the handsome Hemp Nettle which is so plentiful in the Fens and the North but has very rarely been seen in Surrey. Nearby was *Galium erectum* Huds., on bare chalk where a defence ditch had been filled in. In the Chipstead Valley we saw *Verbascum Lychnitis* L. var. *album* (Mill.), and at the end of the day we went to see a cornfield near the Long Plantation, Chipstead, which had a quantity of an alien vetch discovered by Mrs Welch —this was *Vicia dasycarpa* Tenore. A few weeks later, in a cornfield near Kingswood, I saw *Fumaria Martinii* Clav. to which I was directed by A. E. Ellis. This fine Fumitory, rare even in south-west England, was first found here by Mr. Ellis in 1938 (*B.E.C. 1938 Rep.*, 34). In August, in the company of D. K. Morton, I saw Henbane, *Hyoscyamus niger* L. in quantity on the border of a chalky field in Norbury Park.

C. P. Castell reports that he knows Hart's-tongue Fern, *Phyllitis Scolopendrium* (L.) Newm. in two places on Wimbledon Common. It is still luxuriant in the well at the Rookery, Streatham Common.

On Reigate Heath, Miss B. M. C. Morgan saw two little plants of *Pinguicula vulgaris* L. in flower and she was informed that they had been recently planted. Such actions throw science into confusion and if people desire to plant their favourite flowers about the countryside it is most important that they place the facts on record. Miss Morgan confirms that *Potentilla argentea* L. and *Trigonella ornithopodioides* (L.) DC. are still on Reigate Heath. In September she took me to see a very narrow-leaved *Clematis Vitalba* L. in a lane below the Buckland Hills. This proved to be the var. *Timbali* Drabble, previously known only from the Isle of Wight in this country. Although growing with the usual broad-leaved plant it occurred along some fifty yards of hedge and the leaves were almost equally narrow in shade and full sun exposure. Miss Morgan and Mrs. B. Welch were together when they found *Camelina sativa* Crantz (teste N. Y. Sandwith), *Centaurea Cyanus* L., and *Anagallis foemina* Mill. (shown to me growing later) in chalky fields on Pebblecombe Hill. They also got a plant of *Stachys annua* L. on a tip between Reigate Hill and Kingswood—this alien has an interesting distribution along the North Downs, see *L.N. for 1943*, 10.

Miss E. M. C. Isherwood found a fine colony of *Silene anglica* L. on a sandy bank by Reigate Heath and *Potentilla canescens* Besser. The latter is easily mistaken for exceptionally large examples of the native *P. argentea.*

One of the most welcome Surrey records sent in by Mrs. Welch is that of *Lycopodium clavatum* L. from the south end of Banstead Heath. This was shown to her and Miss Morgan by Miss J. P. Pugh, who had found it earlier in the season. Records of Stag's-horn Club Moss from the country south of our area have been more frequent in recent years but this is the first we have had from within the bounds. Mrs. Welch also reports *Geranium rotundifolium* L. from the tow-path near Isleworth Gate, *Centaurea Calcitrapa* L. as shown to her by Mrs. B. H. S. Russell on the tow-path opposite Kew Gardens, and a dozen or so scattered plants of *Bunias orientalis* L. at Ham pits where they were detected by J. P. M. Brenan. She and others have known *Cynoglossum officinale* L. near Springwell Cottage, Wimbledon Common, since 1945 (cf. *L.N., No. 29,* 10).

From a roadside bank, Burdon Lane, Sutton, R. A. Boniface reports *Carum segetum* B. & H. and *Erigeron acer* L. × *canadensis* L., and he adds Barnes Common to the known localities for *Artemisia Verlotorum* Lam. W. H. Spreadbury sent material of *Stellaria Holostea* L. var. *laciniata* Bromf. from Bookham Common, and C. T. Prime and a party from the Croydon Natural History Society got *Centaurea solstitialis* L. from a field at Addington.

During August the press worked up an absurd enthusiasm over the aliens in the bomb-crater on Brockham Hill—see *L.N., No. 28,* 29. A sober article in *The Times* of the 9th was followed on the next day by the *Daily Mail's* " Botanists puzzled by Britain's oddest garden " and the *Daily Mirror's* " The mystery grows in the hole on the hill." Many other papers and periodicals followed suit, and wild and extravagant theories to explain the arrival of the plants were advanced. Amongst the letters sent to the papers was one from Mr. B. A. Hains of Betchworth published in *The Times* of August 15th. He stated that he had found three localities almost half a mile from the bomb-crater in which foreign species of Digitalis occur, and for these he later kindly sent me detailed directions.

I was unable to visit the pits to which Mr. Hains directed me until late September, by which time many of the aliens found were too far over for accurate identification, but it appears that there are three colonies of *Digitalis ferruginea* L. and one of *D. lutea* L. *Campanula alliariifolia* Willd. grew with colonies of both species and associated with one patch of *D. ferruginea* were at least four other aliens also growing in the original crater. The circumstances are such that there can be no reasonable doubt that the foreigners originated from seed scattered deliberately both in the bomb-crater and in the four new places. Although the person responsible has not yet come forward, the supposed " mystery " may now be regarded as solved. When I visited Mr. Hains' localities with Miss B. M. C. Morgan we were pleased to find a large patch of the native *Astragalus glycyphyllos* L. which is rare in the London Area.

In the bomb-crater on Brockham Hill most of the aliens already recorded appeared once more. In addition, there were fine plants of *Dorycnium rectum* (L.) Ser., of which a specimen was sent for identification by Mrs. K. H. Le Sueur, and *Gentiana lagodechiana* (Kusn.) Grossh. which gardening books say grows well on chalk.

V.-c. 18, SOUTH ESSEX.

Mrs. Welch reports that Miss M. Higginson found *Azolla filiculoides* Lam. at Stapleford Abbots in September.

V.-c. 20, HERTS.

Salsola pestifer Nelson was found by Mrs. R. H. Mortis just within the 20-mile radius near Hertford.

V.-c. 21, MIDDLESEX.

A new plant to Britain which may well prove to be a serious pest in our canals and rivers has been brought to the notice of botanists following an exhibit at a meeting of the Botanical Society of the British Isles. It was found by H. C. Grigg in the Longford River, Stanwell, and named as *Elodea callitrichoides* (Planch.) Caspary, a South American waterweed already observed in quantity in 1949 in the river Colne, Harefield (?v.-c. 20, 21 or 24) by Dr. George Taylor (*The Times* for Nov. 29, 1950). The plant is much more robust than the familiar *Elodea canadensis* Michx. and may have been introduced by aquarists.

T. G. Collett records *Fritillaria Meleagris* L., with both chequered and white flowers, as persisting in an orchard at Pinner (see *L.N., No. 28*, 29). Also from an orchard at Pinner he notes *Lithospermum purpureo-coeruleum* L. as abundant and well established: the Blue Gromwell is now known as a native only in Wales and the west of England. Miss M. A. R. S. Scholey produced a specimen of *Myrrhis odorata* (L.) Scop. from waste ground at Southgate. F. R. Browning had *Galeopsis speciosa* Mill. from cultivated ground at Crouch End, and R. A. Graham observed it in a garden at Northwood where there is a chance that it was introduced with horse-manure.

A particularly interesting find was *Falcaria vulgaris* Bernh. found by Mrs D. Bennett at Hounslow, and seen there by Mrs. Welch, Dr. J. G. Dony and D. H. Kent. Longleaf is an Umbellifer which is increasing in England and tends to be persistent in chalk areas. Mrs. B. Welch noted *Inula Helenium* from a railway bank and on a nearby roadside, Winchmore Hill. E. B. Bangerter and J. K. Morton had *Juncus tenuis* from Ken Wood and W. E. Farenden found *Ruscus aculeatus* L. in a copse between Ealing and Brentford. The records contributed by D. H. Kent include *Chenopodium murale* L. and *Kochia scoparia* (L.) Schrad. from Hanwell tip and *Asplenium Trichomanes* L. from tombs in Ickenham churchyard. Australian *Junci* have reappeared in the pits at East Bedfont and are being studied by Dr. J. G. Dony.

It will be noticed that we again have very few records sent in from South and North Essex, Herts. and Bucks., and it is more than ever important that these areas should receive attention now that a start is being made in publishing a new account of our work. For records contributed during 1950 we are grateful to the following observers:—

E. B. Bangerter, J. W. Barlow (per B.W.), Mrs. D. Bennett (per B.W.), J. S. S. Beesley, R. A. Boniface, F. R. Browning (per D.H.K.), C. P. Castell, T. G. Collett, Mrs. H. R. (I.W.) Davies, A. E. Ellis, W. E. Farenden, R. S. R. Fitter, R. A. Graham, H. C. Grigg (per J.E.L.), E. W. Groves, Miss M. Higginson (per B.W.), Miss E. M. C. Isherwood (per J.E.L.), D. H. Kent, Mrs. K. H. Le Sueur, D. McClintock, Miss B. M. C. Morgan, J. K. Morton (per D.H.K.), C. T. Prime (per J.E.L.), Miss J. P. Pugh (per B.W.), Mrs. B. H. S. Russell, Miss M. A. R. S. Scholey, Mrs. L. M. P. Small, Mrs. B. Welch, A. W. Westrup.

The Cynipid Genus Aulacidea (Hymenoptera).

By M. Niblett, F.R.E.S.

THE genus *Aulacidea* was erected by Ashmead in 1897 with *A. tragoponis* Thoms. as the genotype, to contain those species of the genus *Aulax* whose radial cell is closed upon the costal margin; *A. hypochoeridis* Kieff. is not included by some authors of works on Cynipidae, why I do not know, since all specimens of *hypochoeridis* I have examined had a closed radial cell. Numerous species have been recorded and described from Europe and America. Eight species have been recorded for Britain, all except one confined to plants of the Compositae, and the galls occur on either stem or leaf. The insects are dark-coloured and range in length from 1 to 2.8 mm. There is one sexual generation a year, the insects emerging in the year following the depositing of the eggs, and hibernating as larvae in the galls; these larvae are frequently heavily parasitized by Chalcids of the genera *Torymus*, *Eurytoma*, *Megastigmus*, *Habrocytus*, *Pteromalus*, etc.

Aulacidea andrei Kieff.:—The galls consist of small fusiform swellings on the midrib of leaves of *Hypochoeris maculata* L. This species was added to the British list by Bagnall in 1931, who claimed to have found three galls in Essex. So far as I know no other record exists for Britain. It has been stated that the insects emerge in May and are 1.5 mm. in length.

A. graminis Cam.:—In 1875 Cameron described a gall he found on the root of *Agropyron repens* Beauv. and the insects bred from it, to which he gave the name *Aulax graminis*; later, however, he stated that he considered it to be a variety of *A. hieracii*. I do not know if the original insects still exist, and believe no one has recorded such a gall since, although some works on galls include it.

A. hieracii Bouché.:—There is considerable diversity in form of galls of this species, which occur upon the stems of several species of *Hieracium*. They are sometimes fusiform, sometimes globose, may have leaflets on the surface, or forming a tuft at the apex if the gall is terminal. Or again there may be a number of shaggy hairs on the surface of the gall, while frequently they are quite free of leaves or hairs; they also vary very considerably in size.

I have found the galls from the beginning of August onwards, and have had them from Byfleet, Chilworth, Walton Heath, West End Common, Wimbledon Common and Worms Heath in Surrey; Benfleet, Essex; Darenth Wood, Kent; and Storrington, Sussex.

The gall-wasps emerge from early in May to early July, their numerous Chalcid parasites emerging during the same period.

A. hypochoeridis Kieff.:—The galls of this species occur upon the flower-stalks of *Hypochoeris radicata* L.; they vary very much in length and girth, and often cause considerable distortion of the stalks. Their host-plant is plentiful and widely distributed, but the gall appears to be local in its occurrence.

I have found the galls from the beginning of June onwards, the gall-wasps emerging from May to July of the following year, Chalcids emerging at about the same time. On one occasion a Chalcid emerged in September of the first year.

I have had the galls from Addington, Ashtead Common, Banstead Downs, Bookham Common, Boxhill, Coulsdon, Croham Hurst, Effingham, Epsom Common, Epsom Downs, Fetcham Downs, Mitchley Wood, Oxshott Heath, Riddlesdown, Sanderstead, Walton Heath, West End Common, and Worms Heath, Surrey; Peacehaven, Sussex; Benfleet, Essex; Brockenhurst, Hants.; and East Cowes, Isle of Wight; rarely in any numbers.

A. pilosellae Kieff.:—The galls of this species were first recorded for Britain by Bagnall and Harrison in 1916. I found my first galls in 1943 at Banstead Wood, and have found them since in several other localities in Surrey: Banstead Downs, Bookham Common, Boxhill, Buckland Hills, Epsom Common, and Walton Heath, but only in very small numbers.

The galls take the form of small fusiform swellings on the midrib of leaves of *Hieracium vulgare* Tausch. They may be found from July onwards, but very close searching is necessary. I have found what appear to be similar galls occasionally on the runners of the plant; these however, yielded Chalcids only.

The gall-wasps emerge in June and July of the second year, and here again Chalcids take heavy toll of the larvae, these emerging in August of the first, and June and July of the second years.

A. subterminalis Niblett.:—I first discovered the galls of this species in July 1943, and described the insect as a species new to science in 1946. The gall is more or less globular, 3 to 5 mm. in diameter, pilose, and is situated just below the terminal rosette of leaves on the runners of *Hieracium vulgare.* I have found the galls at Ashtead Common, Banstead Wood, Boxhill, Effingham Common, and Walton Heath, in Surrey, in very small numbers as a rule.

The gall-wasps emerge at the end of June and in early July of the second year, and Chalcids from June to August.

A. tragoponis Thoms.:—The galls of this species were first recorded for Britain by Bagnall and Harrison in 1930. They take the form of swellings, often low down, on the stems of *Tragopogon* spp., and may be found in summer and autumn, the gall-wasps emerging in June and July of the following year, usually in some numbers. This gall has not been much in evidence during the past few years; in 1947, however, I found it in a number of localities, in some of which it was quite plentiful.

I have found it on *Tragopogon pratense* L. at Banstead Wood, Boxhill, Epsom Downs, Headley, Riddlesdown, Selsdon Wood, and Woodmansterne; and on *T. minus* Mill. at Bookham Common.

Somewhat similar but quite small galls on the leaves of *Tragopogon* have been found occasionally, but no insects were bred from these and I am inclined to believe they were misplaced galls of *A. tragoponis.*

I have found little evidence of parasitism in this species, very few Chalcids having emerged from the numerous galls I have had, these in May and June of the second year. Continental literature gives only one species.

Aulacidea sp.?:—In 1934, I found several galls on flower-stalks of *Hieracium vulgare* with Cynipid larvae in them. These resembled galls of *A. hypochoeridis* but were much smaller. Unfortunately, no gall-wasps were bred from them, and I have been unable to find any similar galls since. There is no reference to any such gall in any literature I have had access to, and they may eventually prove to be caused by a species of *Aulacidea.*

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Plant Galls in Surrey, 1950.

By M. NIBLETT, F.R.E.S.

THE following is a list of Plant Galls observed during 75 visits to 36 localities in the Society's area in Surrey during 1950. During the year it was noticed that many species of galls were definitely scarce; others were locally plentiful, including several of those not frequently seen, and quite a number of species were not seen at all.

CYNIPIDAE:—On the Oaks, some species of catkin galls which were closely searched for were not seen at all. *Neuroterus schlechtendali* Mayr, *N. baccarum* L. and *Andricus quadrilineatus* Htg., were fairly plentiful in many areas. *Andricus callidoma* Htg. form *cirratus* Adler, was found in four localities, and in two, Bookham Common and Fetcham Downs, it occurred in some numbers; all seen were on the lower branches of the trees.

Galls of *Neuroterus aprilinus* Gir., *Biorhiza pallida* Oliv., and *Andricus circulans* Mayr, the latter on *Quercus cerris* L., were generally fairly plentiful; *Cynips disticha* Htg., *Andricus glandulae* Schck., *A. fecundator* Htg. and f. *pilosus* Adler, *A. curvator* Htg., *A. ostreus* Gir. and *Adleria kollari* Htg. were all seen in fair numbers; while *Andricus ramuli* L., *A. radicis* Fab., *A. seminationis* Adler, *A. inflator* Htg. and f. *globuli* Htg., *Neuroterus albipes* Schck., *Cynips folii* L. and f. *taschenbergi* Schlct., *C. longiventris* Htg. and f. *substituta* Kinsey, and *C. divisa* Htg. were definitely scarce.

Neuroterus baccarum L. f. *lenticularis* Oliv. was exceptionally plentiful, *N. numismalis* Oliv. locally plentiful, and *N. albipes* Schck. f. *laeviusculus* Schck. widely distributed in fair numbers.

On Roses, galls of *Rhodites rosae* L. were locally plentiful, smooth pea-galls of *R. dispar* Niblett and/or *R. eglanteriae* Htg. were rather scarce in many localities, and the spiked pea-galls of *R. dispar* definitely so; few galls of *R. mayri* Schlct. were seen on *Rosa micrantha* Sm. and *R. rubiginosa* L., and a few of *R. spinosissimae* Gir. on *R. canina* L. in three new localities.

One gall only of *Diastrophus rubi* Bouché on *Rubus sp.* was seen.

Aylax papaveris Per. on *Papaver rhoeas* L., and *Phanacis centaureae* Forst. on *Centaurea nigra* L. and *C. scabiosa* L. were found in fair numbers in several localities.

A few *Liposthenes latreillei* Kieff. were seen on *Nepeta hederacea* Trev. in several localities, including one new one; and *Isocolus rogenhoferi* Wachtl on *Centaurea scabiosa* L. in a fair number of localities, including six new ones. A number of achenes of *C. nigra* galled by *Isocolus jaceae* Schck. were found in one locality.

Aulacidea hypochoeridis Kieff. was seen on *Hypochoeris radicata* L. in four localities, including three new ones, Ashtead and Bookham Commons, and Coulsdon. *A. hieracii* Bouché on *Hieracium* sp. was definitely more scarce than usual. Bookham Common was a new locality for *A. tragoponis* Thoms., where several galls were found on *Tragopogon minus* Mill.

Cecidomyidae :—Midge galls were much less numerous than usual in the majority of cases, but those of several uncommon and interesting species were found.

Galls resembling those of *Dasyneura aparine* Kieff. were found on *Galium aparine* L., containing yellow jumping larvae of an undescribed species of Cecid.

Flower-heads of *Plantago lanceolatus* L. were found at Bookham Common and Coulsdon galled by *Dasyneura schmidti* Rubs.; both are new localities. Flowers of *Solidago virgaurea* L. were found containing the larvae of an undescribed Cecid. *Janetiella leemei* Kieff. on *Ulmus montana* Stokes was found in four localities, two being new ones. *Dasyneura polygoni* Rübs. on *Polygonum amphibium* L. was again found at Epsom. *Dasyneura dittrichi* Rübs. on *Silaus flavescens* Bernh. was found in some numbers in one locality, and less plentifully in two others. A cultivated Violet was found with the leaves heavily galled by *Dasyneura affinis* Kieff. It was noticed that there were very few galls of the second brood of *Dasyneura epilobii* F. Lw. on *Epilobium angustifolium* L.

The following Midge galls were also seen. On *Achillea ptarmica* L., *Rhopalomyia ptarmicae* Val.; on *Barbarea vulgaris* Br., *Dasyneura sisymbrii* Schrck.; on *Betula pubescens* Ehrh., *Anisostephus betulinum* Kieff.; on *Bryonia dioica* L., *Dasyneura bryoniae* Bouché; on *Centaurea scabiosa* L., *Loewiola centaureae* F. Lw.; on *Cornus sanguinea* L., *Craneobia corni* Gir.; on *Crataegus monogyna* Jacq., *Dasyneura crataegi* Winn. and *D. oxyacanthae* Rübs.; on *Daucus carota* L., *Kiefferia pimpinellae* F. Lw. and *Lasioptera carophila* F. Lw.; on *Fagus sylvatica* L., *Hartigiola annulipes* Htg.; on *Fraxinus excelsior* L., *Dasyneura fraxini* Kieff.; on *Galium aparine* L., *Dasyneura aparines* Kieff.; on *Galium mollugo* L. and *G. palustre* L., *Geocrypta galii* H. Lw.; on *Hypericum pulchrum* L., *Dasyneura hyperici* Br.; on *Linaria vulgaris* L., *Diodaulus linariae* Winn.; on *Medicago sativa* L., *Contarinia medicaginis* Kieff.; on *Nepeta hederacea* Trev., *Rondaniola bursarius* Br.; on *Polygonum amphibium* L., *Wachtliella persicariae* L.; on *Populus tremula* L., *Contarinia tremulae* Kieff., *Harmandia globuli* Rübs., *Lasioptera populi* Wachtl. and *Syndiplosis petioli* Kieff.; on *Pteris aquilina* L., *Dasyneura filicina* Kieff.; on *Prunus spinosa* L., *Putoniella marsupialis* F. Lw.; on *Rosa arvensis* Huds. and *R. canina* L., *Wachtliella rosarum* Hardy.; on *Rubus* spp., *Dasyneura plicatrix* H. Lw.; on *Salix atrocinerea* Brot., *Iteomyia capreae* Winn., *I. major* Winn., *Rhabdophaga rosaria* L. and *R. salicis* Schck.; on *Salix caprea* L., *Rhabdophaga rosaria* L.; on *Sambucus nigra* L., *Placochela nigripes* F. Lw.; on *Senecio jacobaea* L., *Contarinia jacobaeae* H. Lw.; on *Silaus flavescens* Bernh., *Kiefferia pimpinellae* Kieff.; on *Sonchus arvensis* L., *Cystiphora sonchi* F. Lw.; on *Spiraea ulmaria* L., *Dasyneura ulmariae* Br.; on *Solanum dulcamara* L., *Contarinia solani* Rübs.; on *Stachys sylvatica* L., *Wachtliella stachydis* Br.; on *Tanacetum vulgare* L., *Rhopalomyia tanaceticola* Karsch; on *Taxus baccata* L., *Taxomyia taxi* Inch.; on *Tilia europaea* L., *Contarinia tiliarum* Kieff.; on *Tragopogon pratensis* L., *Contarinia tragoponis* Kieff.; on *Trifolium repens* L., *Dasyneura trifolii* F. Lw.; on *Urtica dioica* L., *Dasyneura dioicae* Pers.; on *Viburnum lantana* L., *Phlycti-*

dobia solmsi Kieff.; on *Veronica chamaedrys* L., *Jaapiella veronicae* Val.; on *Vicia cracca* L., *Anabremia viciae* Kieff., *Dasyneura spadicea* Rübs. and *D. viciae* Kieff.; on *Vicia sepium* L., *D. spadicea* Rübs.; on *Vicia tetrasperma* Moench, *D. loewiana* Rübs. and *D. viciae* Kieff.

TRYPETIDAE:—On *Cnicus arvensis* Hoffm., galls of *Urophora cardui* L. were seen in numerous localities, but nowhere in any great numbers; on *Centaurea nigra* L., those of *Urophora jaceana* Her. were as numerous and widely distributed as usual; on *Cnicus lanceolatus* Willd., galls of *Urophora stylata* F. were generally plentiful; on *Pulicaria dysenterica* Gray, a fair number of *Myopites blotii* Bréb. galls were seen; on *Achillea millefolium* L., one gall of *Oxyna flavipennis* H. Lw. was found in a new locality; on *Senecio vulgaris* L. a few galls of *Sphenella marginata* Fln. were found; on both *Hieracium umbellatum* L. and *H. murorum* L., numerous galls of *Hoplochaeta* (*Noeeta*) *pupillata* Fln. were seen in several localities; on Bookham Common in September, one specimen of *Ditricha guttularis* Mg. was swept by Mr. P. W. E. Currie—this species is supposed to form a gall on the roots of *A. millefolium*, but intensive search in the area failed to reveal any galls.

APHIDIDAE:—Few Aphid galls were seen. On *Populus nigra* L., galls of *Pemphigus bursarius* L. and those of an undetermined species were found; on *Ulmus campestris* L. and *U. montana* Stokes, *Tetraneura ulmi* Deg. and *Eriosoma ulmi* L. were fairly plentiful in some areas; on *Artemisia vulgaris* L., galls of *Cryptosiphum artemisiae* Pass. were found in several localities.

ERIOPHYIDAE:—Mite galls were found to be locally plentiful with some species, but generally not too plentiful: on *Artemisia vulgaris*, *Eriophyes artemisae* Can.—it was noticed that in one locality this species had spread over a very wide area since it was first seen there some years ago; on *Acer campestre* L., *Eriophyes macrochelus* Nal. and *E. macrorrhynchus* Nal.; on *Alnus rotundifolia* Mill., *E. laevis* Nal., *E. laevis inangulus* Nal. and an Eriophyid sp.; on *Carpinus betulus* L., *E. tenellus* Nal.; on *Centaurea scabiosa* L., *E. centaureae* Nal.; on *Corylus avellana* L., *E. avellanae* Nal.; on *Crataegus monogyna* Jacq., *E. goniothorax* Nal.; on *Euonymus europaeus* L., *E. convolvens* Nal.; on *Galium aparine* L., *E. galii* Nal.; on *Origanum vulgare* L., *E. origani* Nal.; on *Populus tremula* L., *E. dispar* Nal. was plentiful in one locality; on *Prunus spinosa* L., *E. similis* Nal.; on *Pyrus aria* Ehrh., *E. pyri* Pagst.; on *Rubus* spp., *E. gibbosus* Nal.; on *Solanum dulcamara* L., *E. cladophthirus* Nal. was seen in three localities; on *Thymus serpyllum* L., *E. thomasi* Nal.; on *Tilia europaea* L., *E. tiliae* Nal. and *E. tiliae liosoma* Nal.; on *Ulmus campestris* L. and *U. montana* Stokes, *E. ulmi* Nal.; on *Viburnum lantana* L., *E. viburni* Nal.; on *Sambucus nigra* L., galls of *Epitrimerus trilobius* Nal. were much less in evidence than is usual.

FUNGI:—Few galls caused by Fungi were seen. On *Aesculus carnea* Hayne, a Witches' Broom, probably caused by a species of *Taphrinia*; on *Mercuralis perennis* L., *Synchytrium mercuralis* Libert was seen in two localities; on *Tragopogon pratensis* L., *Ustilago tragoponis* Wint. was fairly plentiful; on *Urtica dioica* L., a few galls of *Puccinia caricis* Schum. were seen at Bookham Common.

Reports on Temporary Geological Sections in the Society's Area.

DURING the year further work has been carried out with encouraging results. Thirty-one records are presented below compared with sixteen for 1949, whilst many other Sections are under investigation. Several new helpers have come forward but the bulk of the work is still being left to too few. Much more assistance is needed, particularly in giving information as to the existence of building sites or any other excavations. Those with some geological experience, willing to undertake the investigation of a site, should apply for a copy of a leaflet which has been prepared as a guide to the information required.

Individual thanks have been omitted from the reports but the opportunity is now taken of expressing the Society's thanks to all those members and others who have contributed Records, assisted in the identification of material, or given their help in any other capacity. The Society's thanks are also extended to those owners, architects, contractors, etc., without whose co-operation these Records could not have been completed.

M. AINSLEY (Recorder for Temporary Sections).

LONDON E.C.

L.N.H.S./T.S./22/50. LONDON E.C.1.

57-61 CLERKENWELL ROAD. On the south side of Clerkenwell Road and extending south to Broad Yard. Bounded on the west by Booth's Distillery and with a frontage to Clerkenwell Road of approximately 100 ft. eastward from the Distillery. The basement level of the site was 11 ft. 6 in. below pavement level in the N.W. corner. Excavation for building foundations. The site was examined in the spring of 1950.

Deposits examined. (2) Problematical flint gravel.
(1) London Clay.

(1) *London Clay.* The clay below basement level was weathered brown to a depth of 1 foot. Below this was a variable depth of mottled blue and brown friable clay with small crystals of selenite, passing down into blue clay. A row of scattered claystone nodules was found at a depth of 5 ft. below basement level. The surface of the blue clay (seen in a trench about 8 ft. deep parallel to and 12 ft. from the west boundary of the site) was as follows:—

Distance from N. wall. Feet.	Depth of unweathered blue clay below basement level. Feet.
37	4
49	3
67	5
85	approx. 6
103	more than 6

Other trenches gave confirmatory results.

(2) *Gravel.* The N.W. corner of the site showed a patch of sub-angular flint gravel of varying thickness lying on the clay. It had a brown or greenish sandy matrix and contained several quartzite pebbles of Bunter type. The gravel appeared to be *in situ* but may perhaps be regarded with some suspicion since a small patch of similar gravel in the south end of the site was found to be lying on a slab of concrete. The architects' records did not throw light on this, since little gravel was encountered in clearing the site. The gravel was not more than 2 ft. thick and its extent from the N.W. corner of the site was probably not more than 10 ft. along either boundary at the basement level of the site.

John F. Hayward.

L.N.H.S./T.S./43/50. London E.C.2.

129-139 Finsbury Pavement. On the west side of Finsbury Pavement and the south side of Chiswell Street with a frontage of 120 ft. to Finsbury Pavement and of 78 ft. to Chiswell Street. An L-shaped site with a depth of 48 ft. to Finsbury Pavement and of 78 ft. to Chiswell Street. The floor level of the site was at about 43.00 O.D., as taken from a nearby bench mark at 56.06 O.D.

Excavations for building foundations. The site was examined in December 1950.

Deposits examined. (4) Black alluvium or marsh mud.
(3) Yellow clay with pebbles.
(2) Gravel and Sand.
(1) Brown clay (? London Clay).

(1) *Brown Clay.* This was seen only in the deepest excavations, its surface being about 9 ft. below the floor level at a point 20 ft. from Finsbury Pavement, and about 6 ft. below floor level a further 60 ft. to the west. At its surface it was a chocolate brown clay, but at a depth of 2 ft. to 3 ft. it became a wet yellow clay typical of the most extreme weathering of London Clay. To investigate this, auger samples were taken in the west end of the site. At a depth of approximately 5 ft. below the surface of the clay it was taking on a definitely grey colour, but hard blue clay was not reached.

(2) *Gravel and Sand.* In a pit in the north-east corner of the site these were seen to consist of the following:—

(d) About 1 ft. of buff coloured sand [Sand sample 1].

(c) Yellow brown gravel with large sub-angular flints in an abundant sandy matrix. Approx. 2 ft. Pebbles up to 2 in. in diameter, generally less [sample 2].

(b) About 1 ft. of sand similar to (d) [sample 3].

(a) In the base of this excavation a buff-coloured fine silty sand was seen. Elsewhere a similar sand 1 ft. thick was seen to rest on the yellow clay (1) [sample 4]. It was a fine cohesive sand, which retained its shape on drying, but readily broke up on being handled.

In other parts of the site the thicknesses of sands and gravel varied even within a few feet.

Mechanical analyses of sand samples 1, 3 and 4 gave the following results:—

	Percentage below 60 mesh.	Percentage between 60 and 30 mesh.	Percentage above 30 mesh.
1.	22.0	76.7	1.3
3.	77.5	22.1	0.4
4.	99.9	less than 0.1	nil

Bromoform separation of heavy minerals from these sands and from the sandy matrix of gravel sample 2 were made and a description of heavy minerals will be the subject of a separate report.

(3) *Yellow Clay with Pebbles.* This overlaid the gravel and sand over most of the site and was at the floor level where it was not disturbed by building footings or covered by the black mud. It consisted of a yellow clay with a varying quantity of pebbles and was presumably derived from the resorting of London Clay and gravels by solifluction. Its general thickness was up to 3 ft. but near the west end of the site it thinned to about 6 in.

(4) *Black Alluvium or Marsh Clay.* A river channel approximately 28 ft. wide at the floor level of the site was filled with a black mud containing pottery fragments, etc., passing into a dark brown mud near the edges of the channel. At its deepest it went to 8 ft. below the floor of the site and the sides sloped down gradually to that level. In the southern part of the site the channel ran parallel to the Finsbury Pavement edge of the property, its eastern edge being (at the floor level of the site) about 4 ft. 6 in. west of the wall flanking the pavement. At the north of the site the channel appeared to be slightly further to the west. Shallow patches of black mud with flint pebbles were found in other parts of the site.

A sample of the black mud is retained for further investigation. A cursory examination revealed:—

The mineral vivianite.
Land snails (*Helix nemoralis* Linné).
Vertebrate bones (chiefly horse and cattle; one human fragment).
Pottery (including 17th century pieces).

The site is in the area once known as Moorfields, a marshy region outside the city walls, and the channel is presumably one of the streams forming the former river Wallbrook. Samuel Pepys recorded that houses were beginning to be built in the region just after the Great Fire.

John F. Hayward.

L.N.H.S./T.S./40/50. London E.C.3.

Mincing Lane, Mark Lane, and Great Tower St. On the N. side of Great Tower St., bounded by that street, Mincing Lane and Mark Lane and on the north by existing buildings. Frontage to Mincing Lane approx. 150 ft. and to Mark Lane approx. 250 ft.

The basement level of the site was 31.50 O.D. and most of the excavations examined went to a depth of 4 ft. to 6 ft. below this level.

Excavations for building foundations. The site was examined during Spring and Summer 1950.

Deposits examined: Gravels and sands (mapped as Higher Flood Plain Terrace).

Generally a coarse brown flint gravel with a sandy matrix and with irregular lenticular patches of yellow-brown sand which rapidly thickened, separated or thinned out. Although generally yellow-brown, the sand and gravel were in places red, black-coated or bleached white, and the gravel was locally devoid of sandy matrix. In a trench which ran from a point approx. 40 ft. N. of the Mincing Lane—Gt. Tower St. angle of the property for a distance of about 75 ft. in a direction at right angles to the west boundary of the site a persistent bed of sand was examined for a distance of more than 35 ft. The base of the sand rose from 3 ft. 6 in. below basement level at the east end of the trench to 2 ft. 6 in. below basement level at a point 30 ft. along in a westerly direction, but the upper surface of the sand was irregularly eroded and was covered by gravel containing brick fragments In other excavations irregular sand patches were discovered, none of which suggested that this sand bed was very extensive in a north or south direction. It is possible that a 9 in. seam of sand at a depth of 2 ft. at a point 30 ft. to the south represents this bed [sand sample 9]. Excavations 30 ft. to the north of the trench showed only irregular sandy patches [See Plate I).

A scale plan of the site is retained by the undersigned by courtesy of the architects, and exact records of the location of sand and gravel in certain of the excavations are available.

Samples of sand and gravel were retained for examination, their exact positions being recorded. Sand samples and the sandy matrix of the sandy gravels were treated with bromoform (sp. gr. 2.75) and the heavy residues will be described in due course. The samples are as follows: —

Sand samples 1, 2, and 3. These are horizontal variations taken at 6 ft. intervals near the base of one pit. 2 and 3 belonged to the same lenticle which thinned out between 1 and 2.

1. Coarse buff coloured sand with angular flint grains, which gave a large crop of heavy minerals.

2. Fine, buff coloured cohesive sand which did not spontaneously break up when dried.

3. Fine, uniform, ginger coloured sand with little coarse material.

Sand samples 4 and 5 are vertical variations from 2 ft. and 3 ft. respectively below basement level in another pit.

4. Subangular flint gravel with pebbles up to 1 in. long with a matrix of ginger coloured sand. The sandy matrix (less than 2 mm. diameter) gave a heavy residue of about 10% by weight.

5. Similar to (2) but slightly cohesive.

Samples 9 and 10 are vertical variations, the sand (No. 9) being a bed 9 in. thick above the gravelly sand (No. 10) in a third pit.

9. Similar to (1). Large crop of heavy minerals.

10. Pale gravel of rounded or subangular flints with a matrix of pale buff sand. The sandy matrix (less than 2 mm.) gave a heavy residue of 8.1% by weight.

Mechanical analysis of the sands gave the following percentages by weight:

	Below 60 mesh.	Above 60 but below 30 mesh.	Above 30 mesh.
Sand 1.	12.6	63.1	24.3
Sand 2.	81.4	18.0	0.6
Sand 3.	63.9	34.3	1.5
Sand 5.	66.1	10.0	23.9
Sand 9.	11.6	66.1	23.3

JOHN F. HAYWARD.

L.N.H.S./T.S./35/50. LONDON E.C.4.

28-33 FARRINGDON ST. On the east side of Farringdon St. 20 ft. south of the pavement edge in Newcastle St. and stretching for 50 ft. to the east of Farringdon St.

The basement level was 8 ft. below the pavement level above the west end of the trench and the depth of the trench below the basement level was 5 ft.

Trench for the base of the party wall between Nos. 32-33 and 28-31 Farringdon St., and borings within the trench for the purpose of piling. The site was visited during the autumn of 1950.

Deposits examined. (2) Alluvial or land surface deposits.
(1) London Clay.

(1) *London Clay.* Blue clay, weathered to a depth of 6 ft. and containing frequent bands of more silty clay. The clay was found in borings only, and typical samples from known depths were retained by the undersigned. Small nodules of pyrite were found at various depths and a band of claystone concretions was encountered at a depth of 25 ft. to 26 ft. in more than one boring.

(2) *Alluvial or land surface deposits.* The trench was found to contain made ground and black silty material with some pebbles. A sample of the " silt " from borehole A (3 ft. to 6 ft. below the base of the trench) was examined in the laboratory and consisted of a clay with abundant plant debris and a small amount of sand and gravel consisting of rounded quartz grains and angular or sub-angular flint grains and fine sand. Some pebbles, chiefly of the small rounded type typical of the " Pebble Gravel " were present. Washing revealed:—

(a) Seeds which are retained for identification.

(b) Some stems of moss, identified by Mr. J. H. G. Peterken as *Eurhynchium praelongum* Hobkirk.

(c) Two beetle elytra (Carabids).

Field Relations. The relation of the deposits to each other may be seen in the results of the borings. Records of three are given below. All started from the base of the trench but they were not exactly in a straight line. The terms in inverted commas are the descriptions in the foreman's log.

A.

(11 ft. 8 in. from roadway)

		Feet.	Inches.
" Made ground "		3	—
" Silt "		3	6
London Clay—	brown mottled clay	6	—
	blue clay	18	—
	silty clay	2	—
	blue clay	2	—+

B.

(20 ft. 2 in. from roadway)

		Feet.
" Made ground "		3
" Silt "		3
London Clay—	brown mottled clay	6
	blue clay	18
	silty clay	2
	blue clay with silty layers at intervals continued to a depth of 73 feet below the base of the trench Boring stopped.	

C.

(48 ft. 10½ in. from roadway)

		Feet.
" Made ground "		5
London Clay—	blue clay	26
	silty clay	2
	blue clay	7+

JOHN F. HAYWARD.

L.N.H.S./T.S./46/50. LONDON E.C.4.

FETTER LANE. On the site of bombed building (Messrs. Charrington's public house, "The Three Tuns"), on the east of Fetter Lane, directly opposite the western end of East Harding Street and about 100 yards N.W. of Dr. Johnson's house in Gough Square, off Fleet Street.

Examined in March 1950, the following section was observed:—(Measurements taken from pavement level in Fetter Lane)

Made Ground up to 6 feet.
Taplow Terrace Gravel up to 7 feet.

The Made Ground is Mediaeval to 18th Century containing much red tile, some potsherds and many shells of edible marine mollusca: *Ostrea edulis*, *Cardium edule*, *Mytilus edulis* and *Buccinum undatum*. Bones including *Sus*, rabbit and a small bird were found. The seeds of *Sambucus nigra* were common.

The following land mollusca occurred and indicate the proximity of marshy or damp ground:

Arion sp. (granules) frequent.
Goniodiscus rotundatus (Müller).
Helix aspersa (Müller) frequent.
Lymnaea peregra (Müller) 1.

Oxychilus cellarius (Müller).
Succinea pfeifferi (Rossmässler) 4.
Trochulus hispidus (Linné) common.
Zua lubrica (Müller).

J. N. Carreck and A. G. Davis.

L.N.H.S./T.S./23/50. London E.C.4.

Salters' Hall Site, Walbrook. Bounded on the west by Walbrook and on the east by St. Swithin's Lane and forming a rough rectangle extending on the west side approximately 100 ft. south from the Church of St. Stephen's, Walbrook. The levels within the site varied but the details given below have been related to the pavement level in Walbrook.

Excavation for building foundations. The site was examined in the latter part of 1949 and the early part of 1950.

Deposits examined. The site showed Flood Plain Gravel of the Thames deposited on an uneven surface of London Clay and itself excavated into a valley by the former River Walbrook. Alluvial deposits of this river were found lying on the eroded surface of the gravel.

Data obtained from site records. Details of three trial borings approximately in a line stretching in a direction 30° south of east from a point 45 ft. south of the boundary with St. Stephen's Church :

Borehole No.	(2)	(3)	(1)
Distance from pavement in Walbrook ...	13 ft.	39 ft.	98 ft.
Approx. level of top of boring (below pavement level)	13 ft. 6 in.	13 ft.	0 ft.

Details of Borings :—

(2)

	Feet.	Inches.
Made ground	13	—
Blue silt	3	—
Mottled clay	1	6
Sandy clay	2	6
Brown sandy clay	1	6
Sand and gravel	—	4
Brown clay grading into blue clay	37	—+

(3)

	Feet.	Inches.
Made ground	9	6
Silt and shells	2	6
Brown sandy clay and gravel	1	6
Mottled sandy clay	3	—
Gravel	3	6
Dark brown clay	4	—+

(1)

	Feet.	Inches.
Made ground	16	—
Gravel	18	6
Brown clay with some pebbles near the top ...	27	—+

Details of an artesian well sunk in 1908 in the N.E. corner of the site are recorded by the Geological Survey (*Records of London Wells.* Mem. Geol. Surv., 1913, p. 118. Well No. H/95).

Data obtained by an examination of the site.

Gravel. Sandy, sub-angular flint gravel with bands of sand. The gravel contained some quartzites (Bunter type) and quartz pebbles. Four sandy bands were observed and samples were preserved for laboratory examination as follows:—

4. Fine loamy sand.
3. Green stained sand.
2. Similar to (4) but coarser.
1. Coarse ferruginous sand.

The lowest of these was at about the basement level of the site in the N.E. corner, i.e., approximately 26 ft. below pavement level. The gravel and sandy beds were very evenly bedded with a general dip of 4° in a direction approximately 20° W. of N.

The gravel was disturbed in the east end of the site by cesspits of Roman age and the base of a wall of ragstone of about the same age. The gravel was followed, in the same area, by sandy and stony alluvial deposits grading up into made ground.

In the west end of the site, at a lower level, the marshy alluvial deposits of the Walbrook were found to contain abundant Roman remains. Hand specimens of various deposits were retained by the undersigned.

Archaeology. The site has provided a wealth of Roman antiquities which are preserved in the Guildhall Museum. [See *Discoveries on Walbrook, 1949-50*, Guildhall Museum Publications, 1950.]

JOHN F. HAYWARD.

LONDON W.C.

L.N.H.S./T.S./39/50. LONDON W.C.1.

HIGH HOLBORN. On the North side of High Holborn, the site was bounded by Warwick Court on the East, by Brownlow Street on the West and by Bedford Row on the North.

During excavations for building foundations in the summer of 1950 the following section was exposed at a point about the centre of the High Holborn frontage. Measurements taken from pavement level.

		Feet.
4.	Old building foundations	16
3.	Gravel	5
2.	Light brown clay	2
1.	Blue clay (London Clay)	4+

The Blue Clay (Bed 1) contained a well defined line of Septarian Nodules one foot from the top. No fossils were observed.

The Light Brown Clay (Bed 2) was possibly weathered London Clay.

Little Gravel (Bed 3) was seen, most of it having been removed during previous building operations. Possibly none of this bed was *in situ.*

B. AINSLEY.

L.N.H.S./T.S./38/50. LONDON W.C.2.

REMNANT STREET, KINGSWAY. The site extended from Kingsway to the corner of Lincolns Inn Fields along the North side of Remnant Street.

Excavations for building foundations in the summer of 1950 showed about 8 feet of coarse reddish Gravel. Brown Clay was said to be present near the Kingsway frontage at a depth of about 10 feet. Measured from pavement level.

B. Ainsley.

L.N.H.S./T.S./34/50. London W.C.2.

Tavistock Street, Covent Garden. A shaft sunk at a point on the N.E. corner, where Tavistock Street is crossed by Catherine Street, showed the following section:—

		Feet.
3.	Disturbed ground	4 (approx.)
2.	Coarse sandy gravel	18
1.	Blue clay	(not pierced)

The information was obtained from the foreman, samples of the Blue Clay were not seen by the observer. Measurements from road level.

B. Ainsley.

L.N.H.S./T.S./33/50. London W.C.2.

Wellington Street, Aldwych. A shaft sunk at a point on the west side of the street opposite the end of Exeter Street, showed about 20 feet of sandy gravel. Measured from road level.

B. Ainsley.

LONDON N.

L.N.H.S./T.S./24/50. London N.1.

361-373 City Road. On the north side of City Road approximately 190 ft. east of the pavement edge in Colebroke Row and with a frontage of 120 ft. to the east thereof.

The depth of the site along its west face was 108 ft. 7 in., the whole forming approximately a rectangle. The basement level of the site at the west end of the frontage was approximately 9 ft. below the pavement of City Road.

Excavations for building foundations. The site was visited during the summer of 1950.

Deposits examined. (2) Yellowish gravelly loam, associated with
(1) Yellowish loam or brickearth.

(1) *Loam.* A sample from a depth of 4 ft. below basement level at about the middle of the north face was retained for examination. It consisted of a yellowish-brown loam, easily cut with a knife when moist, but which set hard on drying. A roughly dried sample was found to consist of 69% ochreous clay and 31% sandy matter. The sand consisted of fine rounded grains of transparent quartz and larger angular flint grains. Heavy mineral separation (bromoform sp. gr. 2.9) resulted in a crop of limonite grains.

(2) *Gravelly loam.* Pebbles in a matrix resembling the loam. The majority of the pebbles were rounded or angular flint pebbles less than

one inch in greatest diameter but larger pebbles up to 3 or 4 inches occurred. One pebble of white sandstone and one of chert were found. Many of the flint pebbles were small and well rounded and of the "Pebble Gravel" type.

Field relations. The excavations were shallow pits and trenches and showed great variation from place to place. In general, the gravelly loam was uppermost and occupied the top 3 ft. below basement level, but the junction between it and the underlying loam was irregular. Patches without pebbles occurred in the gravelly loam. Pebbles seemed less numerous in the N.E. corner than elsewhere. A deep pit near the S.E. corner of the site was examined down to 6 ft and consisted of stony matter for the greater part of the depth with an irregular surface of the loam near base, but this sequence did not persist in spots only a few yards away.

John F. Hayward.

L.N.H.S./T.S./44/50. London N.1.

132 New North Road. A site approximately 110 ft. × 75 ft. situated 143 ft. to the east of New North Road and 55 ft. to the north of Poole Street. The 100 ft. side was parallel to New North Road.

Levels were calculated from the floor of the site, approximately equivalent to the pavement level of Poole Street 80 ft. from its junction with New North Road.

Excavations for the foundations of a workshop. The work was carried out in the Spring of 1950, and all details were supplied to the undersigned from the site records.

Deposits recorded. Gravel and sand.

The surface of the gravel was at about 9 ft. below floor level and it was excavated for a further 1 ft. or 2 ft. It was a buff coloured gravel of well rounded flints, not more than 1½ in. in diameter and generally less than 1 in. The gravel had a sandy matrix which comprised at least half of it.

The gravel was capped by a bed 1 ft. thick of buff coloured "sharp" sand of medium grade. The top and bottom boundaries were consistent and undisturbed over the area. The sand was covered by a light capping of gravel passing up into made ground which varied in thickness.

John F. Hayward.

LONDON E.

L.N.H.S./T.S./37/50. London E.1.

Colonial Wharves, Wapping High Street, Warehouses C, D and E. On the south side of Wapping High Street with a frontage of approximately 78 ft. to that street and to the river. The depth of the site was 86 ft. and it consisted of the three most westerly warehouses of the block, each approximately 26 ft. by 86 ft. The warehouses, C, D and E from east to west, are immediately east of the alleyway (opposite to the end of Hellings Street) giving access to the wharf.

All levels are related to an arbitrary datum line at 6 ft. 7¼ in. O.D. Excavations were started from the former floor of the site, approximately 3 ft. above this.

Excavations within the walls of existing buildings for the purpose of rebuilding. The site was examined between January and October 1950.

Deposits examined. (2) Alluvial material.
(1) River gravel.

(1) *River gravel.* Owing to the seepage of water and the excavation of the overlying alluvial matter the sample examined was very dirty, but when washed it resembled the gravel from Standard Wharves which are the subject of a separate report (L.N.H.S./T.S./42/50). No mineralogical examination was therefore made of this sample. The site records show that the surface of the gravel was encountered between the existing footings at the following levels. It is possible that some gravel was removed when the original warehouses were built but the levels can be accepted as an indication of the original surface of the gravel. The details are from warehouse E, but the others gave comparable results.

Distance from river frontage.	Surface of gravel encountered (below arbitrary datum line).	
Feet.	Feet.	Inches.
3 - 13	10	9
21 - 28	10	3
33 - 40	9	6
45.5 - 52	8	—
58 - 64	7	6
70.5 - 82	7	2

(2) *Alluvial material.* The former floor of the site (approx. 6 in. thick) rested on an uneven thickness of hardcore which in turn rested on black gravelly mud. There was evidence which suggested that some or all of the latter had been removed and later backfilled in the course of the original building operation (about 1870). Laboratory examination of a sample indicated that it was a genuine sediment although it contained fragments of man-made material. It contained abundant plant debris and a basis of stones and sand. Washing produced a few seeds (which were retained for identification) and the following shells:—

Valvata piscinalis (Müller).
Bithynia tentaculata (Linné).
Theodoxus fluviatilis (Linné).
Fragment cf. *Limnaea* (*Radix*) *pereger* (Müller).
Helix aspersa Müller, juv.

All except the second were represented by single specimens only.

John F. Hayward.

L.N.H.S./T.S./42/50. London E.1.

Standard Wharves, Wapping High Street. On the south side of Wapping High Street with a frontage of approximately 130 ft. to that street and to the river. Depth on the east face of the site, 63 ft. and on the west face 56 ft. The site is immediately east of Colonial Wharves, part of which is the subject of a separate report (L.N.H.S./T.S./37/50).

All depths are related to an arbitrary datum level at 10.00 Newlyn datum.

The work consisted of drilling for more than 300 piles of which records of a few were available. The site was visited during the second half of 1950.

Deposits examined. (3) Alluvial deposits.
(2) River gravel.
(1) London Clay.

(1) *London Clay.* A grey or bluish grey clay which varied from a typical clay with occasional micaceous flakes to a grey clay with a large percentage of silty matter. The exact relation between the two was not clear, though in places it appeared that the silty clay was the higher. The surface of the clay was weathered brown and contained material from the overlying gravel.

(2) *River gravel.* Greyish gravel of angular or sub-rounded flints in a sandy matrix. It was typical gravel of the type known to builders as "Thames ballast". A heavy mineral examination of the sand which passed a 2 mm. sieve is in hand.

(3) *Alluvial deposits.* These varied from place to place. In some borings they consisted of dirty gravel and sand with abundant crushed oyster shells. In others they varied from black peaty clay to a greyish black clay with pebbles. The upper surface of these deposits had been disturbed by the building operations.

Field relations. Details of strata encountered in a few of the borings are available and actual samples from recorded depths have been retained by the undersigned. The following are records of three borings, all being related to the datum level at 10.00 N.D.

(1)

	Feet.
Distance from outer edge of present river wall ...	8
Disturbed ground	14
Dirty gravel	5
River gravel	13
Gravel with brown clay	1
Brown clay with pebbles	3
Blue grey clay	8+

(2)

	Feet.
Distance from outer edge of present river wall ...	28
Disturbed ground	10
Silt and clay	4
Dirty gravel	4
River gravel	12
Brown clay	2
Grey clay	3
Blue clay	5+

(3)

	Feet.
Distance from outer edge of present river wall	42
Disturbed ground	13
Silt	1
Dirty gravel with shell	4
River gravel	12
Brown and grey clay	2
Blue clay	8+

John F. Hayward.

L.N.H.S./T.S./41/50. London E.2.

St. Mary's Estate, Shoreditch, Blocks I and II. The first two of a number of blocks of flats grouped round the site of the Church of St. Mary's Shoreditch, which was destroyed by enemy action.

Block I. On the east side of Haggerston Road and the south side of Kent Street, with a frontage of 253 ft. to Haggerston Road and 132 ft. to Kent Street. The whole block is a T-shaped building and occupies part of the area, which is approximately rectangular.

Block II. On the west side of Haggerston Road and the north side of Kent Street, with a frontage of 198 ft. to Haggerston Road and a frontage of 40 ft. to Kent Street.

All levels in the sites were related to an arbitrary datum point, a manhole cover near the centre of the Haggerston Road-Kent Street crossroads. This was taken as 100 ft.

Excavations for the foundations of blocks of flats. The site was examined in November 1950. The work on both blocks was well advanced at the time of the first visit.

Deposits examined. (2) Deposits of buried channel.
(1) Gravels and sands (mapped as Taplow Terrace).

Gravels and sands.—These were seen best in an excavation in the south end of Block II measuring approximately 40 ft. × 50 ft. and 10 ft. deep. In the east face of the excavation, undulating layers of yellow-brown sand and gravel were examined. The two were generally concordant with each other but the gravel in places slumped into the sand. The sand and gravel lenses interdigitated and tended to thin out rapidly, so that whereas sand predominated in the east face it was the gravel which was more in evidence on the west face. The gravel consisted of generally well rounded or sub-angular flints with some quartz. Most pebbles were up to 2 in. in greatest diameter set in a basis of sand or sandy loam. The gravel was mostly well sorted, so that the larger pebbles were confined to certain horizons.

Three sand samples were collected from the east face and the table below gives their positions and the results of their mechanical analysis.

	Sample 1	2	3
	Feet.	Feet.	Feet.
Distance W. from pavement edge of Haggerston Rd.	28	28	28
Distance N. from Angle of Haggerston Rd. and Kent St.	37.5	37.5	60
Height in relation to arbitrary datum point	95.75	97.75	95.75

	%	%	%
Percentage below 60 mesh	33.6	91.5	98.6
Percentage between 60 and 30 mesh	44.3	8.0	1.4
Percentage above 30 mesh	22.4	0.25	negligible

Sands 2 and 3 both contained a noticeable quantity of flakes of muscovite. Sand 3 was fine and loamy, 31% by weight remaining in aqueous suspension for 10 seconds or more.

Deposits of buried channel. Immediately before it was filled with concrete a pit near the south-east end of Block I was examined. It covered a space of 6 ft. × 6 ft. and was 15 ft. deep. The pit contained coarse brown gravel with sandy matrix, similar to that described above, with a horizontally bedded sand. Cut in the gravels was a deep channel which descended almost vertically for 10 ft. and narrowed to a pipe at the base of the pit. The channel was filled with brown clay with pebbles, the under surface being sandy.

A similar deposit of clay with pebbles was found in a shallow pit near the north end of Block II.

Further investigation was impossible since all bases had been filled with concrete, but some information was available from site records, since all bases were excavated until gravel was reached. Hence the deepest excavations indicated the presence of clay to a depth. From these data it was inferred that the buried channel crossed the north end of Block II obliquely from N.W. to S.E., crossed Haggerston Road and Kent Street, and passed behind Block I, which it crossed obliquely about 135 ft. south of Kent Street.

Further observations will be made as work on further blocks is started.

JOHN F. HAYWARD.

L.N.H.S./T.S./36/50. LONDON E.11.

LEMNA ROAD, LEYTONSTONE. In the angle between Lemna Road and Kirkdale Road with a frontage of about 115 ft. to Lemna Road and of 110 ft. to Kirkdale Road. The excavation was a rectangle of approximately 95 ft. by 90 ft. with the exception of a re-entrant rectangle of approximately 42 ft. by 46 ft. in the corner opposite to the angle of the roads, the 46 ft. side being parallel to Lemna Road.

The basement level of the site was 10 ft. $0\frac{3}{4}$ in. below an arbitrary datum point, a manhole cover in Lemna Road approximately 6 ft. from the pavement edge on the S.E. side of that road and approximately 165 ft. from the junction with Kirkdale Road.

Excavation for building foundations. The site was examined in the autumn of 1950. The whole site had been excavated at the time of the first visit and all details were interpreted from the walls of the site or from verbal information received.

Deposits examined. (4) ? Solifluction deposits.
(3) Gravel with clay matrix.
(2) Sandy Gravel (mapped as Boyn Hill Terrace).
(1) London Clay.

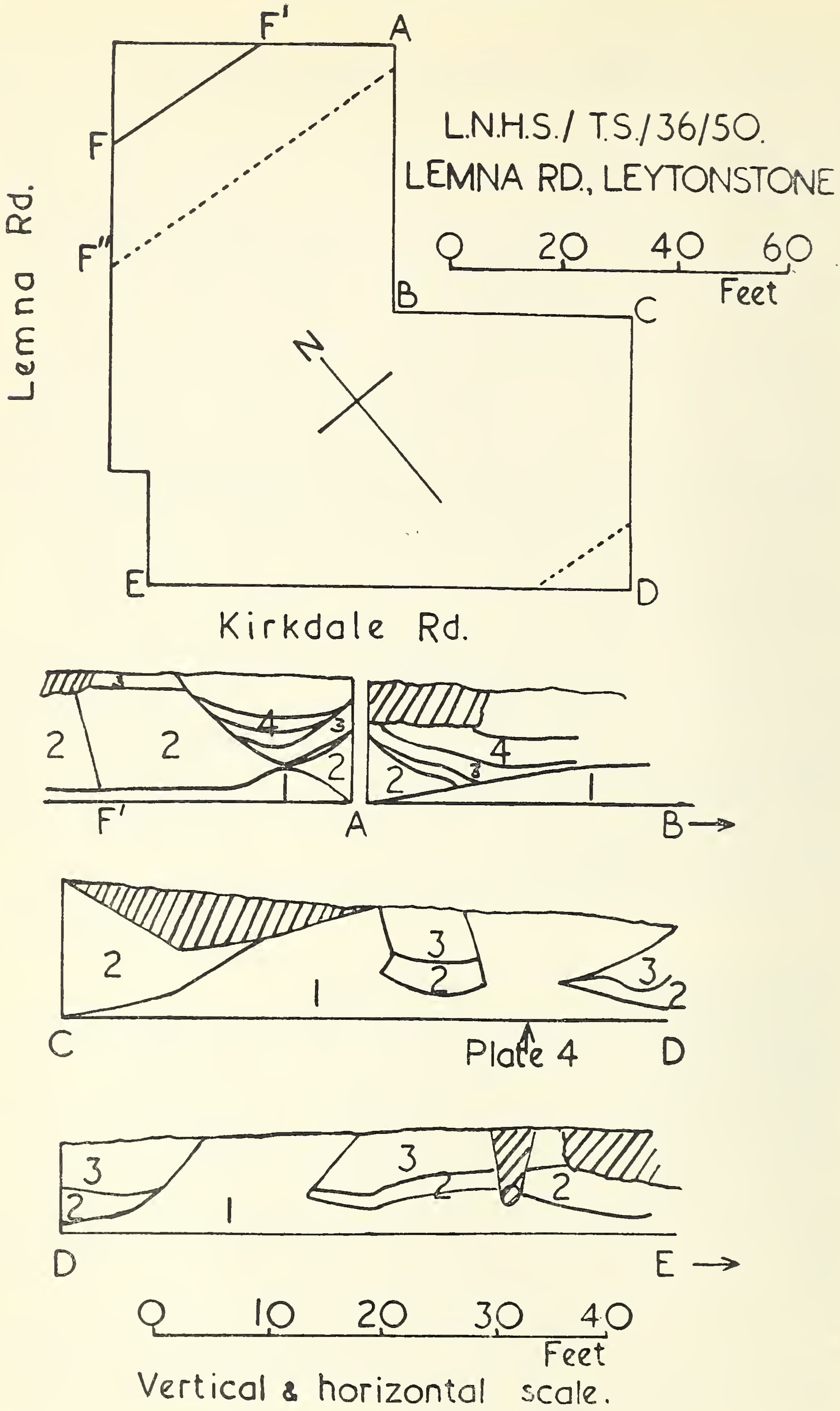

Figure 1. Lemna Road, Leytonstone (L.N.H.S./T.S./36/50).

A plan of the site with drawings of some of the more important structures seen in the sides. These were measured at intervals, usually 6 ft., and the intermediate details were inserted freehand. The figures 1 to 4 have the meanings given in the text. FF′ is the main fault, and F″ is the "fault without a downthrow". The dotted line from this parallel to the main fault passes into the structures at A. The other dotted line joins two corresponding points in the structures and is also roughly parallel to the main fault. Oblique shading indicates disturbed ground. [J.F.H.]

(1) *London Clay.* This was encountered at or above 1 ft. below basement level over the whole site, except for a small area in the N. corner extending not more than 15 ft. along either of the adjoining faces. Where the clay was examined in a freshly dug state, it was a typical blue-grey clay with some septarian nodules. The uppermost foot was weathered brown. The surface of the clay was irregular. In the north end of the site the clay was near the basement level, but in the south end the surface was much higher, but was involved in the structures described below and was probably not entirely undisturbed. Near the south end the clay was penetrated to varying depths by roots of trees.

(2) *Sandy gravel.* This consisted of a uniformly brown gravel, in which the larger pebbles were well worn or smooth and the smaller interstitial pebbles were more angular. The pebbles were set in a matrix of brown sand, and the deposit was generally well consolidated or even conglomeratic. The whole was well bedded. Where percolating water had been at work, the ferruginous matter had been leached out leaving the pebbles and sand white. The gravel was cut by the small faults described below, but over most of the N.W. face and also the N.E. face it was otherwise undisturbed and showed a general dip of about 8° in a northerly direction. A bed of sand of up to 1 ft. 2 in. thick, becoming indeterminate in the northern angle of the site, was seen in the upper part of the gravel. A sample of the sand was treated with bromoform (sp. gr. 2.75) and a description of the heavy minerals will be the subject of a separate report.

(3) *Gravel with clay matrix.* This gravel, which was apparently due to resorting of the previous gravel and of the London Clay, rested upon an eroded surface of the sandy gravel over the whole site. It was unaffected by the fault previously mentioned where the fault was seen in the face parallel to Lemna Road. The thickness of the deposit varied up to about 2 ft. or more rarely 2 ft. 6 in.

(4) *? Solifluction deposits.* It was clear that the London Clay in the south end of the site had been subjected to movement, although in a weathered surface it appeared to be homogeneous. In the S.W. face of the site it was found to contain an inclusion which was apparently a worn piece of a septarian nodule. Unfortunately this was cleared away before it could be retained by the undersigned for further examination. In the north-east corner, south of the fault, the following deposits, presumably derived from the London Clay and the terrace gravel were seen lying in festoons above the gravel with clay matrix.

(4c) Brown clay with some pebbles.
(4b) Grey clay.
(4a) Grey clay with pebbles.

Field relations. The fault already mentioned crosses the pavement edge on the S.E. side of Lemna Road at a point 82 ft. 6 in. from the middle of the drain cover at the junction of Lemna Road and Kirkdale Road. From that point it crosses the site at a bearing of 5° south of true east. It was visible on the two faces of the site adjacent to the north angle of the site. The hade, calculated from the two apparent hades, was 8° with a downthrow of 7 in. to the south. The fault was seen as a white band in places where percolating water had removed the iron stain from the gravel. On the face parallel to Lemna Road the fault did not apparently affect the gravel with clay matrix which here occupied the top 2 ft. of the section. The London Clay at the base was not seen, but it was reported that the clay was unaffected by the fault. In the N.E. face the upper part was obscured, but the London Clay at the base was seen and was unaffected by the fault which therefore represented a slipping movement on the clay. North of the fault the deposits were normal but to the south of it various structures were observed.

21 ft. to the S.W. along the face parallel to Lemna Road a second "fault" was seen. No downthrow was observable, but evidence of dislocation existed in the form of a vertical white band, due to water action as described above, and in the presence of pebbles which lay with their long axes vertical. A line drawn from this fracture parallel to the former fault passed through a series of slumping structures in the N.E. corner of the site. It, therefore, appears to be the extreme edge of the slumping movement. Similar apparent fractures were seen in the east part of the site.

The surface of the London Clay was in places hollowed out and the higher deposits had slumped into the hollows. It was noticed that the pebbles in the gravels frequently lay with their long axes parallel to the hollowed out surfaces. In the S. corner of the site an hour-glass structure in apparently continuous London Clay had the two later gravels forced laterally into it. This structure was seen in two faces and a line joining two comparable points was approximately parallel to the fault already mentioned. That the London Clay was not undisturbed was suggested by the inclusion mentioned above.

Immediately south of the fault in two faces similar festoons also involved the believed solifluction deposits which lay on the lower gravels. At one place a thin pipe of London Clay containing tree roots was surrounded by gravels on at least two sides. It may be that the presence of the roots was responsible for protecting the pipe from removal although clay on either side of it was carried away.

JOHN F. HAYWARD.

LONDON S.E.

L.N.H.S./T.S./6/49 (Part 2). LONDON S.E. 1.

WATERLOO. Site of the Concert hall for the 1951 Festival of Britain. Additional Faunal and Floral List. The following section published in the *London Naturalist* for 1949 is here repeated for convenience:

	N.W. end		S.E. end	
	Feet.	Inches.	Feet.	Inches.
(e) Made Ground	6	0	6	0
(d) Alluvium Clay and Silt	4	8	16	0
(c) Fine Yellow Sand and Sandy Gravel ...	8	6	(absent)	
(b) Gravel	3	0	10	0
(a) London Clay	10	0+	10	0+

Mr. J. N. Carreck has recently received reports by specialists on material he collected. In view of the fact that a Roman age was assigned in part to Bed (e) it must now be recorded that no remains of this age have been definitely identified; the evidence suggests 17th to 19th Century.

From bed (d) the following additions are recorded from above the peat:—

MAMMALIA.
A few undetermined or indeterminate fragments.

MOLLUSCA.
Ancylastrum fluviatile Müller, one only.
Arion sp., granules, rare.
Limax sp., one only.
Limnaea palustris Müller, rare.
Oxychilus cellarius (Müller), rare.
Planorbis albus Müller, rare.
Sphaerium corneum (Linné), rare.
Succinea sp. indet., fragment.
Valvata cristata Müller, common.

INSECTA. Determined by Dr. J. Balfour Browne.
Anoplus roboris Suffrain, one elytron; a weevil occurring on alder.

OSTRACODA. Determined by Department of Zoology, British Museum (Nat. Hist).
Eucypris cf. *zenkeri* (Chyzer), rare.
Candona cf. *fabaeformis* (Fischer), common.

PLANTAE. Seeds and fruit determined by the Department of Botany, British Museum (Nat. Hist.).

Aethusa ? sp.
Carex sp.
Corylus sp.
Galium aparine ? (Linné).
Juncus aff. *articulatus* (Linné).
Montia sp.
Polygonum persicaria (Linné).
Prunus sp.
Rubus idaeus (Linné).
Rumex sp.
Sinapis alba ? (Linné).
Solanum nigrum (Linné).
Stellaria media ? (Linné).

The following additions are recorded from bed (e):—

MAMMALIA. Determined by Mr. I. W. Cornwall, Institute of Archaeology.
?*Capra hircus* Linné.
Felis cf. *domesticus* Linné.
Equus caballus Linné.
Ovis aries Linné.
?*Sus scrofa* Linné.

MOLLUSCA.

Ostrea edulis Linné. Human food debris.
Theodoxus fluviatilis Linné, common.

PLANTAE. Determined by the Department of Botany, British Museum (Nat. Hist).

Aethusa sp. (?).

A. G. Davis and J. N. Carreck.

L.N.H.S./T.S./19/50. London S.E.4.

Brockley Grove, Brockley. On the West side of Brockley Grove, between Elsiemaud Road and Chudleigh Road, several feet of Shelly Sands were exposed during road repairs, yielding a list of fossils similar to that obtained in Musgrove Road, New Cross. (L.N.H.S./T.S./18/50.)

S. A. J. Pocock.

L.N.H.S./T.S./18/50. London S.E.4.

Musgrove Road, New Cross. Several feet of fossiliferous Sands yielding the following " Woolwich Beds " shells were exposed during road repairs:—

Brotia (*Melania*) *inquinata* (Defrance).
Cyrena cuneiformis (J. Sowerby)
Cyrena (*Corbicula*) *cordata* Morris.
Ostrea bellovacina Lamarck.
Tympanotonus funatus (J. Sowerby).

S. A. J. Pocock.

L.N.H.S./T.S./20/50. London S.E.13.

Catford. At the junction of Lewisham High Street and Rushey Green and on the East side of the main road about 400 yds. N.N.E. of Catford Town Hall, between the western ends of George Lane and Davenport Road and nearly opposite Lewisham Prendergast School, Rushey Green.

A rectangular shaped excavation with maximum width (N.-S.) of 76 ft. and a maximum length (E.-W.) of 100 ft.—the Western end stopping 9 ft. short of the pavement edge. The greatest depth of the excavation was 17 ft. below pavement level. Excavation for building

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EXPLANATION OF PLATES.

PLATE I. Site in Great Tower Street (L.N.H.S./T.S./40/50). View across the site from Mincing Lane. In the distance are the church of Allhallows, Barking and the Tower Bridge. Excavations in the foreground show irregularly arranged sands and gravels. 10′ to the right of the right hand edge of the large pit was the trench for drains mentioned in the report. The pit which is barely visible in the bottom right hand corner showed 1′ 6″ of brown sandy clay lying on gravel.

PLATE II. Salters' Hall Site (L.N.H.S./T.S./23/50). View facing north in the large excavation in the east part of the site. Flood Plain Gravels with sands are seen disturbed by two refuse pits of Roman age. The level in the top left corner of the picture is a Roman pavement.

PLATE I.

BRITISH MUSEUM NATURAL HISTORY

PLATE II.

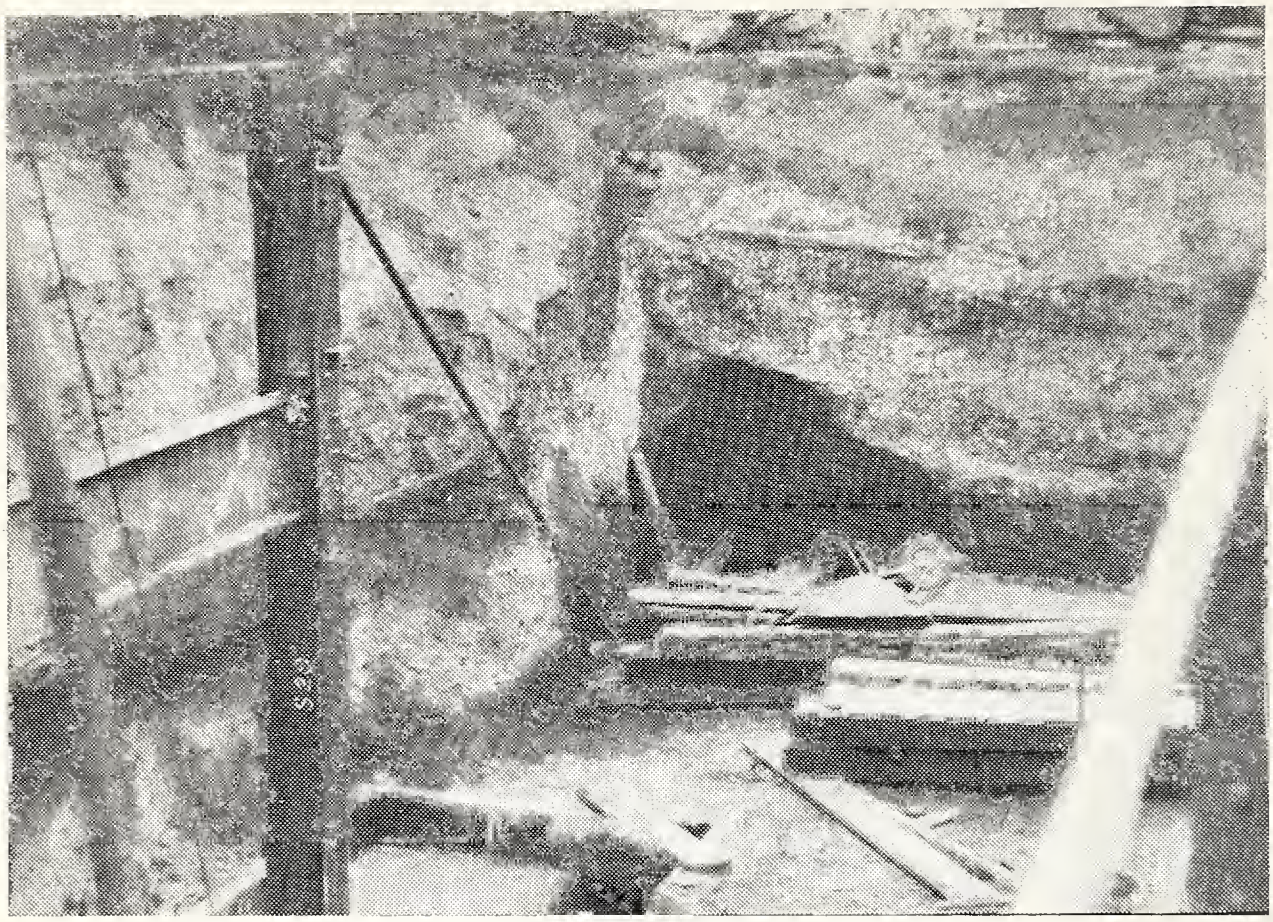


PLATE III.

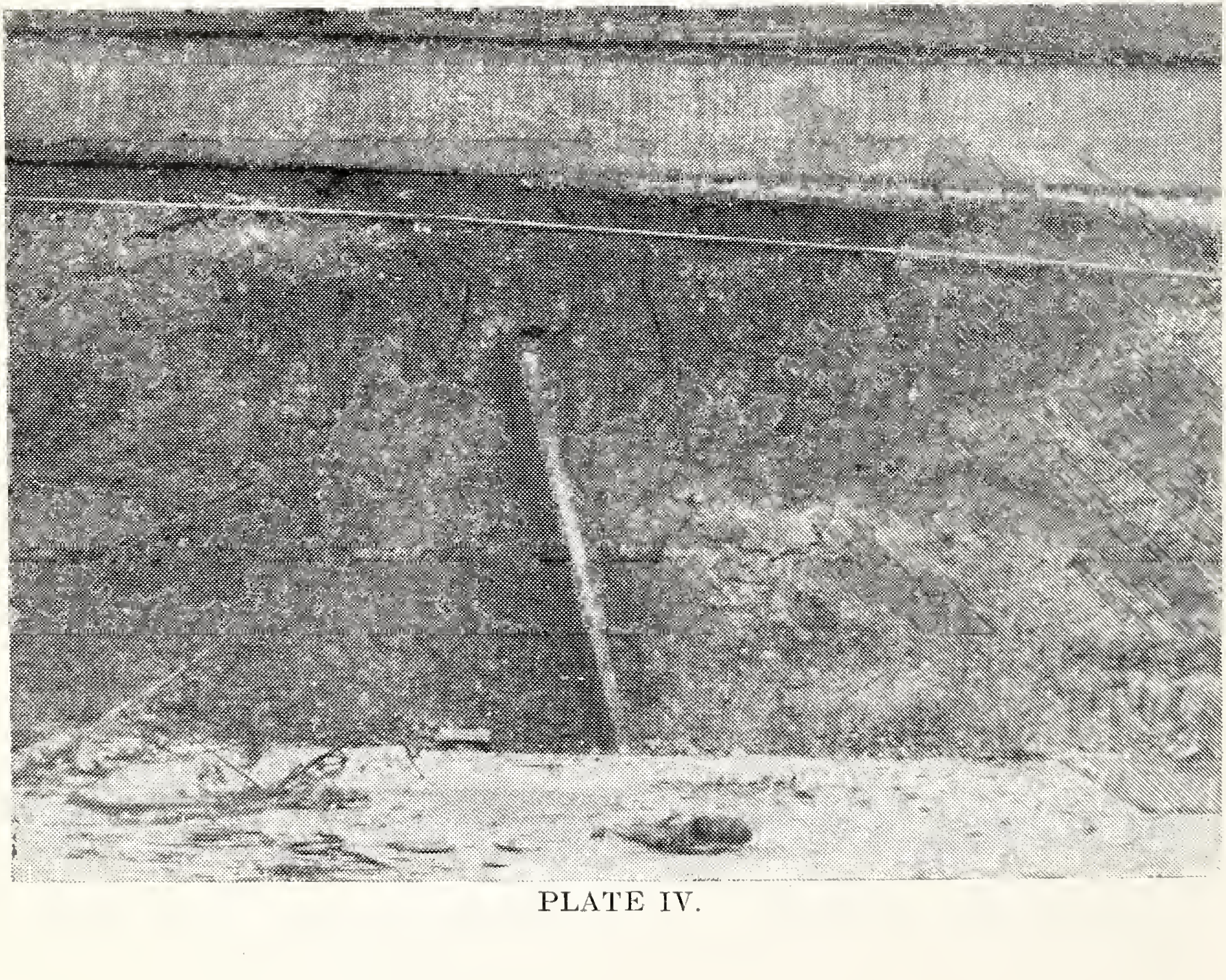


PLATE IV.

foundations. Examined early in 1950. The following section was seen:—

	Western End. Feet.	Eastern End. Feet.
3. Made Ground	4	0-1
2. Gravel	10-13	8
1. London Clay	2+	2-3+

1. *London Clay.* Surface irregular. Consisted of tenacious grey clay. No Septarian nodules or other concretions were seen. Washing for micro-fossils yielded only a piece of pyritized wood.

2. *Gravel.* Well bedded, somewhat argillaceous, ferruginous sand containing flint pebbles, angular and sub-angular flints, with patches of grey clay in places. The pebbles ranged from ¼ to 4 inches in length. A few small red jasper pebbles were seen and also one yellow-brown Sarsen pebble 2¼ in. in length. Most of the pebbles were of Blackheath type, unstained by iron-oxide; the sub-angular flints were patinated and stained yellowish; the angular flints were unpatinated and unstained.

Conclusions. From the measurements at this site and local bore-records, it is seen that the level of the London Clay slopes in a westerly direction to the floor of the nearby valley and the Made Ground and Gravels are seen to thicken in that direction.

The composition of the Gravels suggests derivation from the South or South-East, i.e. from the Blackheath Beds, London Clay, and, perhaps, other Lower Eocene beds. The Sarsen pebble must also have been derived from the Tertiaries.

M. W. Reed.

LONDON S.W.

L.N.H.S./T.S./32/50. London S.W.1.

King Street, St. James. On the South side of King Street opposite the end of Duke Street and adjoining the Eastern side of Cleveland Yard.

Excavations for building foundations in the spring of 1950 showed the following beds to be present:—

EXPLANATION OF PLATES.

PLATE III. Lemna Road, Leytonstone (L.N.H.S./T.S./36/50). The north-east corner ("A" in Fig. 1). The fault is behind the stanchion on the left of the picture. Gravels and other deposits lying on the London Clay can be identified by comparison with Figure 1.

PLATE IV. Lemna Road, Leytonstone (L.N.H.S./T.S./36/50). The "hour-glass" structure shown north of D in Figure 1. The hour-glass is of apparently undisturbed London Clay but evidence suggests that the upper part has been re-sorted or perhaps moved *en bloc.*

[*Photos by John F. Hayward.*]

	Measurements from pavement level in King St. Feet.
3. Made Ground	10
2. Sandy Beds	6+
1. Blue Clay	(not exposed)

Borings in connection with the work were bringing up Blue Clay which was said to occur at 42 ft.

The Sandy Beds (Bed 2) consisted of iron-stained current bedded sands, compact in places and clayey in parts, with some Brickearth and a few lenticles of small angular flint pebbles (¼ in. or less in size).

No fossils were seen.

B. Ainsley.

L.N.H.S./T.S./30/50. London S.W.1.

61, Pall Mall. Excavations for new building foundations in the spring of 1950 exposed 6 ft. of Fine Yellow Sand underlying about 8 ft. of Made Ground. Bones were said to have been found, but these were not available for examination. Measurements were taken from pavement level.

B. Ainsley.

L.N.H.S./T.S./31/50. London S.W.1.

63, Pall Mall. During excavations for building foundations in the spring of 1950 the following section was seen.

Measurements from pavement level	Feet.	Inches
5. Made Ground	8	—
4. Pebbly Sand	2	—
3. Sand and Brickearth	8	6
2. Light Brown Clay	4	6
1. Coarse Gravel	1	6(+)

Bed 3 contained clay seams and was much iron-stained. No pebbles. A portion of a small Mammoth tooth was found. Part of Bed 4 may well have been disturbed and not *in situ*.

B. Ainsley.

L.N.H.S./T.S./21/50. London S.W.1.

Whitehall Gardens. At the junction of Whitehall and Horseguard's Avenue, between the United Services Museum and the Board of Trade Offices.

Base of the section, seen after most of the section had been concreted over, was approximately 26 ft. below street level at the western end of Horseguard's Avenue.

The excavation, which was for building foundations, was examined in the autumn of 1947, and the following section seen:—

	Feet.
3. Made Ground	2 (approx.)
2. Gravels	12 (approx.)
1. London Clay	10+

1. *London Clay.* Grey "soapy" clay with a few fossils. No concretions seen other than a few pyrite nodules. The fossils were as follows:—

From 4 ft. below the base of the Gravels:

Isocrinus tintinnabulum (Forbes). Several ossicles.
Nautilus sp indet. Fragments.

From 9 to 10 ft. below the base of the Gravel:

Dentalium nitens J. Sowerby. Fragmentary.
Fish tooth indet.
Bone fragments indet.

Also the following micro-fossils were determined by Mr. A. G. Davis:

Dentalina cf. *communis* d'Orbigny.
Cristellaria cultrata (Montford), 1 example.
Marginulina wetherelli Jones, 2 examples.
Nodosaria cf. *affinis* d'Orbigny.

2. *Gravels.* Sandy and buff-coloured towards the base, much coarser with red ferruginous cemented bands towards the top. There were many quartz pebbles amongst the rounded flints. Near the base the flints and sand were stained brown and black.

3. *Made Ground.* The whole area was covered with Made Ground but no Holocene alluvium was seen.

J. N. CARRECK.

KENT.

L.N.H.S./T.S./17/50. CHISLEHURST (Grid ref. 434689).

In an anti-tank ditch across a field about 200 yards S.S.E. of Chislehurst Station and 300 yards W. of Tongs Farm, running parallel to the Chislehurst-St. Mary Cray railway line, the following section was observed:—

3 Rubbly Drift.
2. Pebbly Beds
1. Calcareous Sand.

The section was about 6 feet in depth and rather disturbed towards the top. Bed 1 consisted of about 3 feet of calcareous sands which in places were cemented into lenticles of hard gritty and often shelly limestone. In places the sandy beds were crowded with fossils of typical "Woolwich Beds" type. Most of the fossils were crushed, many showed evidence of rolling and a number were bored by the sponge "Cliona."

Bed 2 was up to 2 feet in thickness and consisted of typical "Blackheath" pebbles, this being covered by Rubbly Drift (Bed 3) which cut deeply into the underlying beds in places. The following fossils were collected:—

Brotia (*Melania*) *inquinata* (Defrance).
Cliona erodens (Dollfus).
Cyrena cuneiformis (J. Sowerby).
Cyrena (*Corbicula*) *cordata* Morris
Ostrea bellovacina Lamarck.
Phyllodus toliapicus Agassiz (abundant—determined by H. A. Toombs).
Typanotonus funatus (J. Sowerby)

Conclusions. There was no marked break between the Sands and the overlying Pebble Bed, and the observer suggests that both are of Blackheath age—the fossils of Woolwich Beds age having been derived.

S. A. J. Pocock.

L.N.H.S./T.S./45/50. Keston.

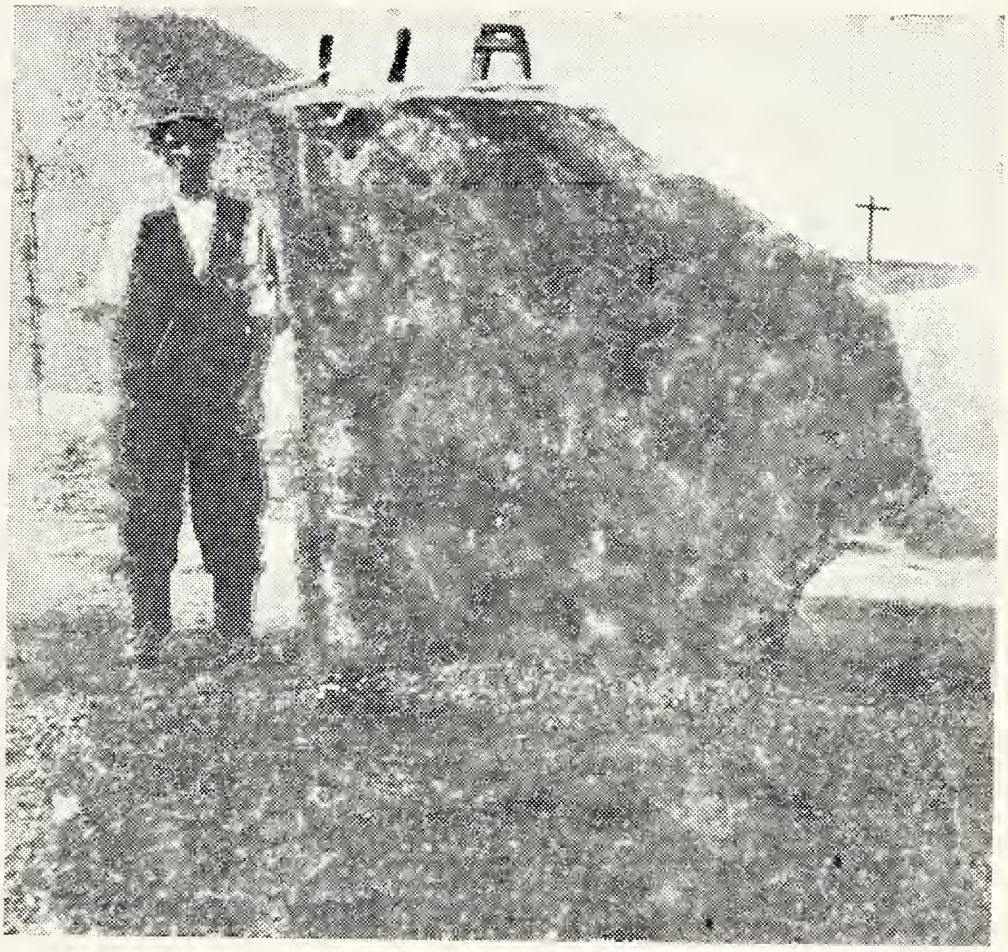
In Blackness Lane, Keston, Kent, northward of Leaves Green Chalk quarry, below Holwood Park, a number of cuttings were made in the hedge bank to provide access to houses situated between Blackness Farm (Bench Mark 350 ft.) and the 400 ft. contour line. In close proximity are hillside Roman works known as War Bank.

Holocene Hill Wash was exposed consisting of six or more feet of chalky sludge resting on solid chalk, the junction showing generally a rubbly top to the chalk. Considerable collections were made by Messrs. A. G. Davis, J. N. Carreck, R. Jefferies, M. Kerney, W. J. Miles and H. R. M. Young in 1949. The faunal list given below was compiled from these gatherings.

Mammalian bones were present and represented domestic species such as *Sus* and *Bos* and probably sheep. Mollusca were quite abundant and consisted of many forms which still inhabit the vicinity or the higher ground. Post Norman invaders like *Candidula caperata* (Montagu), *C. gigaxi* (Pfeiffer) and *Cernuella virgata* (da Costa) are notably absent although they occur living quite abundantly near by. A single example of *Monacha cantiana* (Montagu) was found in the top of the deposit but being most likely to be a "top-soiler" has not been included in the list, which has been prepared from material collected near the base of the deposit to prevent inclusion of any contamination. *Helix aspersa* was present in the base of the deposit; this and the presence of a piece of Roman tile are sufficient grounds for regarding the fauna as belonging to the Roman occupation or a little later.

MOLLUSCA.

Acanthinula aculeata (Müller), 4.
Arion sp. (granules), abundant.
Carychium minimum (Müller), common.
Cecilioides acicula (Müller), common.
Cepaea hortensis (Müller), 1.
Cepaea nemoralis (Linné), common.
Clausilia rugosa (Draparnaud), 4.
Ena obscura (Müller), 1.
Goniodiscus rotundatus (Müller), common.
Helix aspersa, common.
Limax sp., 3.
Marpessa laminata (Montagu), 4.
Oxchilus cellarius (Müller), common.
Planatella itala (Linné), frequent.
Pomatias elegans (Müller), abundant.
Punctum pygmaeum (Draparnaud), 1.
Pupilla muscorum (Linné), 7.
Retinella nitidula (Draparnaud), 3.
Trochulus hispidus (Linné), common.
Vallonia costata (Müller), 4
Vallonia excentrica (Sterki), common.



Photograph of the Hounslow Sarsen Stone taken at the Lampton gravel-pit in 1925.
See p. 38.

BRITISH MUSEUM NATURAL HISTORY

Vertigo pygmaea (Draparnaud), 6.
Vitrea crystallina (Müller), rare.
Vortex lapicida (Linné), 6.
Zua lubrica (Müller), common.

Numerals refer to number of specimens found.

A. G. Davis and J. N. Carreck.

MIDDLESEX.

L.N.H.S./T.S./26/1950. Hampton, Middlesex.

Broad Lane, Hampton. Trenches dug for the laying of water pipes. Sections entirely of gravel almost up to road level. About 8 feet exposed of coarse gravel with irregular bands of sand. Iron pan just below the surface. Considerable amounts of water present and being pumped from deeper shafts at points along the road.

R. E. Butler.

L.N.H.S./T.S./27/1950. Hampton Hill, Middlesex.

Junction of Uxbridge Road with High Street, Hampton Hill. Shaft dug in connection with laying of water pipes. Section showed:—

3. Disturbed ground ... ... 2 ft. (approx).
2. Coarse Yellow Gravel ... ... 6 ft.
1. Blue Clay.

R. E. Butler.

L.N.H.S./T.S./28/1950. Teddington.

Blandford Road. Trench dug for laying a sewer. Depth of 6 ft. exposing gravel and sand. Showed an irregular band of coarse gravel 2 ft. 6 in. below surface. A band of greenish sand was also present 3 ft. 6 in. from the surface. Base of trench mainly fine sand.

R. E. Butler.

L.N.H.S./T.S./29/50. Twickenham.

Hampton Road, Twickenham. (Nat. Grid Ref. 51/151727). The site was on the S.E. side of the road, opposite Third Cross Road. Excavation for building foundations, during the summer of 1950. The following section was noted—the measurements being taken from ground level—approx. equivalent to pavement level.

	Feet.	Inches.
3. Made Ground	1	8
2. Gravel	5-6	—
1. Blue-Grey Clay	(not seen *in situ*)	

Quantities of the Blue-Grey Clay (Bed 1) were lying by the side of the trenches but owing to the presence of running water, presumably on the surface of the clay, it could not be seen *in situ*. The Gravel (Bed 2) was light-brown in colour, argillaceous, and contained medium-sized irregular flints.

B. Ainsley.

L.N.H.S./T.S./25/1950. UXBRIDGE.

HIGH STREET, UXBRIDGE. Two trench sections were seen on the N.E. side of the High Street. One extended from Belmont Road to Uxbridge Station (Met.) and the other from Vine Street to a point half-way to the Public Library.

The excavations, which were for new drains, were up to 9 ft. in depth and exposed a sandy flint gravel containing some quartzites of Bunter type. Blue Clay with a sandy content was heaped beside the trenches and appeared to have come from below the gravel.

Some years ago the observer obtained fossiliferous concretions of the London Clay basement bed from an excavation at a part of the High Street close to its junction with the Harefield Road, nearly opposite the Odeon Picture Palace.

E. EVANS (W. Middx. & S. Bucks. Sci. Soc.).

CORRIGENDA: *London Naturalist*, No. 29.

Temporary Geological Sections numbers L.N.H.S./T.S./5/49 and 7/49.

Page 39, line 7, for "Fine Yellow Gravel" read "Fine Yellow Sand".

Page 43, under heading "Foraminifera" for *Dentalina conimunis* d'Orb. read *Dentalina communis* d'Orb. Under heading "Gastropoda" for *Plychatractus interruptus* (Pilk.) read *Ptychatractus interruptus* (Pilk.).

The Hounslow Sarsen Stone.

DURING the year 1925 a large Sarsen Stone was unearthed at the Hounslow Sand and Gravel Company's pit at Lampton. This stone is probably the largest of its kind ever to be found in West Middlesex. For some reason it was not preserved by the local authorities, whereas a smaller stone found at Ham in Surrey eventually found its way into the Twickenham Museum.

The Sarsen was originally found in gravel about 25 feet below the surface and resting on the London Clay. It was manhandled to the surface, and for a time was on show near the pit. The pits have since been abandoned and become overgrown. The Stone was left on the roadside near the former entrance to the gravel works. Interest in the Stone became revived early during 1951. The theft of the Stone of Destiny from Westminster Abbey at Christmas 1950 led a few Hounslow residents to inquire into the fate of the Hounslow Sarsen and a number of letters appeared in the local press. Local residents urged that the Stone should be preserved, and the matter was taken up by this Society.

Sarsens are of considerable geological and archaeological interest. Many of the so-called ancient monuments are built of them. The outer ring of the most famous one of all, Stonehenge, is built of Sarsens gathered up locally within the Salisbury Plain area. They are very hard sandstones which represent the eroded remnants of Tertiary Beds. They are now found in varying sizes from small boulders to huge blocks weighing several tons. In the London Area they occur in gravels and other superficial deposits.

The specimen at Hounslow consists of a hard white sandstone and weighs about two tons. Its length is about five and a half feet and thickness two feet. It shows some rounding due to water action, and has a number of tubular cavities. There are two such cavities exposed at its surface. Its discovery was recorded by the Ordnance Survey on some of their large-scale maps. It is understood that the authorities have agreed to the proposals to preserve it, and it will shortly be set up as a permanent exhibit in Lampton Park, Hounslow.

R. E. Butler, B.Sc

Book Reviews.

Wild Animals in Britain. By Frances Pitt. Batsford, 12/6. 3rd ed., 1949, pp. 120.

It can no longer be said that there is a shortage of books on British mammals, for we now have excellent works by Oliver G. Pike and Michael Blackmore, as well as this book of Miss Pitt's, to supplement Edward Step in the " Wayside and Woodland " series, which so long held the field as the standard popular work. The present volume is an excellent summary of its subject, well laced with personal observations by one of the few British naturalists who have devoted adequate time to our rather scanty native mammalian fauna, and fully illustrated by fine photography, by Eric Hosking, John Markham, the late A. R. Thompson, Oliver G. Pike, and others, as well as by the author. It is rather a pity that more attention has not been paid in this revised edition to the rather numerous aliens that have comparatively recently been introduced to our shores. The grey squirrel, which most of us in the London Area now see much more often than the red, has less than two pages devoted to it, as against four or five to the red. There is also very little about the various species of deer which have established themselves in many woodlands all over the country, Japanese, axis, muntjac, water-deer, and others. Indeed, there appears to be some confusion in the book between the Japanese deer (*Sika nippon*) and the Siberian roe (*Capreolus pygargus*). But this is a rather minor point, and does not in any way detract from the value of the book as a useful introduction to British mammals.

R. S. R. F.

Wild Flowers of Chalk and Limestone. J. E. Lousley. Pp. xvii + 254 + 81 plates. London and Glasgow: Wm. Collins, Sons & Co. Ltd., 1950; 21/- nett.

This is the second volume in the excellent *New Naturalist* series to be written by a member of the London Natural History Society, and Mr. J. E. Lousley is to be congratulated on producing such an attractive account of the flora of the calcareous areas of the British Isles.

After an introduction to the geography, geology and ecology of the chalk and limestone, the author launches on an account of the flora of the North and South Downs. Two chapters are devoted to Box Hill in Surrey, and here the writer is very much at home, for few people can have such an intimate knowledge of the calcicoles of that area. Common species are treated equally with the rarities, and it is most pleasing to read that despite the numerous visitors to the district our member considers it as good a place for plant-hunting as it was when he first knew it twenty-five years ago. Having been introduced to the classical chalk areas of Southern England, the reader is then conducted chapter by chapter through the Chilterns, the Mendips, Cheddar and Avon Gorges and many other interesting calcareous areas of the British Isles. Mr. Lousley's long experience of British plants serves him well. and almost every page contains some new or little-known fact about some plant or other. Particularly interesting are his observations on the very limited range in Britain of the true Wasp Orchid (*Ophrys trollii*).

The illustrations are contributed by a number of well-known nature photographers, including John Markham, Robert Atkinson and Brian Perkins, and are on the whole very good. The colour plates of *Gentiana germanica* and *Senecio integrifolius* are especially fine and the publishers are to be congratulated for the excellence of the reproduction and colouring. The colour rendering of *Ophrys sphegodes* is less pleasing, and it is a pity that plates 5 and 22 have been printed in reverse to the captions, while plate 19A is unfortunately omitted, though a page reference is given in the index. The author contributes a plate of the Soldier Orchid (*Orchis militaris*) which is unique in that it is probably the first colour photograph of that species in its native British haunt.

The work concludes with a series of maps showing the range of some of the less widespread plants of the chalk and limestone, a vice-county map of the British Isles and a bibliography. Mr. Lousley's book can be thoroughly recommended to botanists, ecologists and all those who love the countryside.

D. H. K.

The Survey of Bookham Common.

NINTH YEAR.

Progress Report.

THE output of work by members has been well maintained in 1950, in spite of the unusual frequency of bad weather on the official monthly visits.

Investigation of the surface geology was continued at the joint meeting with the Geology Section on October 8th.

Messrs. Bangerter and Castell have prepared a preliminary check list of the Flowering Plants and duplicated copies have been made available to interested members; it is hoped to publish this after revision. The distribution of Bracken and Scrub on the plains has been mapped, while observations have been continued on the vegetation of the gun-pits in E. Plain and a short account appears on p. 54. Soil samples were taken from the gun-pits and from a number of other sites and mechanical analyses and pH determinations were kindly undertaken by Mr. A. H. V. Smith. Mr. Norkett has been investigating the Bryophytes and Lichens of Eastern Wood primarily from two points of view; (1) the corticolous bryophytes and lichens on oak, birch, hawthorn, etc., taking about 100 trees of each species at random, (2) the ground bryophytic flora and its distribution with special reference to the *Fissidens* associations.

An enthusiastic team of ornithologists under the leadership of Dr. Beven has continued to study the birds of Eastern Wood and Western Plain; an account of the work in E. Wood by Dr. Beven appears on p. 57. Unfortunately for the survey team, Mr. A. L. Panchen has gone to Cambridge, but he has managed to contribute a summary of the present status of the Reptiles and Amphibians on p. 42.

Col. Bensley has continued, with the help of Mr. B. Taylor, his studies on the population of pond mollusca and reports as follows: "The Isle of Wight Pond can now be considered as settled down after the re-building of the bank and the molluscan population is certainly as great as it ever was. It is noticeable, however, than there are very few adult shells and none of the old eroded *Lymnaea palustris* and *Planorbis corneus* which were a feature a few years ago. The proportions of the five common species show some marked differences; these will be dealt with in the *L.N.* in due course. The draining and clearing out of the streams and ditches in the Central Plain area has completely changed the freshwater population, both in nature and in numbers. Such places as Manor Pond have been more or less eliminated and the stagnant water mollusca with them; I have not been able to make a proper study of this area. Lower Eastern Pond is now a pond in its own right and has a flourishing population of freshwater mollusca resembling those of the Isle of Wight Pond rather than those of Upper Eastern Pond."

Dr. A. M. Easton has now recovered from his long and serious illness and is preparing an account of the Geodephagous Beetles of the Common for the next *L.N.* Mr. Ruttledge has commenced work on the Orthoptera. Mr. Niblett provides the following interim report on his work on the plant galls during 1950:

TRYPETIDAE. The larvae of the following species have been observed during 1950; all have been previously recorded: *Urophora cardui* L., *U. jaceana* Her., *U. quadrifasciata* Mg., *U. stylata* Fab., *Philophylla heraclei* L., *Chaetostomella onotrophes* Lw., *Orellia ruficauda* Feb., *O. tussilaginis* Fab., *Xyphosia miliaria* Schr., *Ensina sonchi* L., *Tephritis conjuncta* Lw., *T. vespertina* Lw.

Mr. Currie swept a male of *Ditricha guttularis* Mg. in September; this is a new record for the Common.

I have been unable to find any larvae of *Paroxyna elongatula* Lw. which I found in some numbers in 1949 for the first time. They feed in the flower-heads of *Bidens tripartita*, the flies emerging in August and early September of the same year, and hibernate during the winter.

Bidens was very late in flowering this year and I am inclined to think that the absence of the larvae this year is probably due to the flies having died before there were any flowers for them to oviposit in.

CECIDOMYIIDAE. Galls of *Dasyneura aparines* Kieff. on *Galium aparine* which I recorded in 1949, being the first record for the Common, were again seen this year.

Dasyneura schmidti Rübs. on *Plantago lanceolatus* I also found; this is a new record for the Common.

CYNIPIDAE. *Andricus callidoma* Htg. from *cirratus* Adl.: the gall, which I found in some numbers, has only been recorded once before.

Aulacidea hypochoeridis Kieff. is another new record for the Common: galls on flower-stalks of *Hypochoeris radicata*.

Further references to Bookham Galls will be found in Mr. Niblett's paper on the Plant Galls in Surrey in 1950 (see p. 11). He is proposing to investigate, in 1951, the distribution of the Trypetidae on the Common, based upon the occurrence of the larvae.

C. P. C.

Notes on the Reptiles and Amphibia of Bookham Common.

By A. L. PANCHEN.

REPTILES.

Three species of reptiles are known to occur on Bookham Common: the Grass Snake (*N. natrix*), the Common Lizard (*Lacerta vivipara*), and the Slow-worm (*Anguis fragilis*). The Adder, which occurs as near as Oxshott Heath and Ockham Common, has never been recorded, although it might be expected to live in the drier bracken-covered plains of Bookham.

The Grass Snake seems to be generally distributed, and is as common as could be expected so near to London. Most records of this species are from Eastern and Central Plain, but this is probably because this area has been more extensively worked.

The Common Lizard although probably distributed over all open parts of the Common is only recorded from the southern half and especially near the station. Records however are too few to get any picture of its distribution.

Records of the Slow-worm are few and scattered, but it is probably widely distributed.

AMPHIBIA.

All the commoner species are found on Bookham Common. The three species of newts are well established and the Palmate Newt, formerly considered a rare species in S.E. England, occurs in almost every pond from which the other two are recorded.

The Common Frog (*Rana temporaria*) breeds in many ponds. It has bred in the Isle of Wight Pond every year since the beginning of the survey, usually in considerable numbers. Early records (1942-44) also show spawning in the Lower Eastern and South Eastern Ponds. In 1950 spawn or tadpoles were recorded from the I. of W. Pond, Upper Eastern Pond, and Gunpit F on Eastern Plain. Mature frogs are fairly common beside the ditches on the south part of the Common and especially in I. of W. Ditch.

The Common Toad (*Bufo bufo*) breeds regularly in very large numbers (several hundred) in the Upper Eastern Pond and in similar numbers in I. of W. Pond, but there are no reliable records of breeding elsewhere.

The Smooth Newt (*Triturus vulgaris*) is very common and widely distributed. It appears to be most numerous in the I. of W. Pond and its outlet, and in "Crater Pond" (map ref. 5447). This former bomb crater is probably the most interesting pond on the common with regard to its fauna and would be remarkable for the density of population of the three species of newts alone. A survey of the gunpits on Eastern Plain in 1950 shows that it was common in C but apparently absent from the others, with the exception of a solitary male recorded in May from Gunpit A.

In 1950 the Palmate Newt (*T. helveticus*) has been recorded from the same sites as the Smooth Newt and is fairly common in the I. of W. Pond and numerous in Crater Pond. There are solitary records from Gunpits A and C.

Records of the Great Crested Newt (*T. cristatus*) for 1950 are also from the same ponds as the last two species with the exception that none has been recorded from Gunpit A. Like the other two it is numerous in Crater Pond.

Two of the records for newts are worth individual mention: a female Palmate Newt was seen awake but very torpid in the I. of W. Pond near the bricked south bank on 12th February 1950 (A. L. Panchen), an exceptionally early date for any British species to be out of hibernation; and a female Smooth Newt seen in the I. of W. Ditch by the footbridge (map ref. 815) on 14th May (A. L. Panchen). This specimen was in mid-stream swimming strongly against the current, and on the approach of a hand-net dodged under a large stone, to emerge into the centre of the stream a few minutes later.

Another interesting point is the apparent disappearance of newts from Bayfield Pond. They were certainly numerous there as recently as 1947 in the spring and early summer; but in spite of observations and sweeps with a hand net in February, March and April, and search under logs and other debris on the bed of the pond, the pond being by then almost dry, in May, none was recorded.

The Spiders of Bookham.

By A. E. Le Gros.

1. INTRODUCTION.

Thirty-four visits were made to Bookham Common in 1947 and 1948 to investigate the spiders of the area. This study ceased with my departure from London but as it is to be resumed in the summer of 1952 I feel that an interim report stating what has been done and what is to be done would be of interest.

In spite of the excellent work in recent years on the life histories of spiders and their inter-relations with the rest of the animal and plant world by Bristowe and Locket in this country, by Nielsen and Norgaard in Scandinavia, by Millot, Bonnet and Berland in France, and by Peters, Wiehle and Gerhardt in Germany, the problems still awaiting solution are many. It is possible for many of these problems to be solved by the ecologist working single handed and I would mention as an example the brief but interesting study of the wolf spiders of Skokholm by Williamson (1949) where an effort is made to throw light on Gause's (1934) contention that no two species living in the same habitat have the same ecology. The ecologist, however, when he has to undertake an investigation requiring continuity of observation and constant counting of individuals, soon finds that he is handicapped by working alone. A team of two or three is needed to bring such an investigation to a successful conclusion in a reasonable period of time, but not every member of the team need necessarily be a specialist. An invitation to assist in my work at Bookham is therefore offered to other members. The co-operation of younger members or beginners would be welcomed. It is possible that some members have been deterred in the past from assisting one or other of the various groups working at Bookham because they felt that lacking specialist knowledge they would be of little use. This is a pity, if true, since there is work for all who come, especially as notetakers. The beginner will find that survey work carried out in close contact with specialists of many orders is an excellent introduction to the study of natural history.

2. ACKNOWLEDGMENTS.

I am indebted to Lt.-Col. C. J. F. Bensley, Messrs. H. J. Burkill, C. P. Castell, C. N. Colyer, P. W. E. Currie, A. H. Norkett, L. Parmenter and other members of the Society for advice, suggestions and the occasional specimen; to Dr. W. S. Bristowe for some notes on Book-

ham spiders, and to Mr. J. F. Perkins of the British Museum (Nat. Hist.) for the identification of Ichneumons. In particular I wish to express my gratitude to Mr. G. H. Locket for his encouragement and advice, gifts of named specimens for comparative purposes and loan of literature which have made it possible for a new recruit to arachnology to undertake this present study.

3. An Initial List of Species.

The only previous reference to Bookham spiders that I have been able to trace is in a paper by Bristowe (1923). All but two of the species (of the fifteen families listed below) recorded in that paper as from Bookham have been found during the course of the survey. Dr. Bristowe (*in litt.*) has pointed out additional species, and although some of these would appear to have been observed just outside the actual survey area they have been included as likely to occur there.

The present list of 100 species and 1 subspecies does not include the Linyphiidae. The identification of a large number of specimens representing, perhaps, 60 to 70 species of this large and " difficult " family had not been completed prior to my departure overseas and it is hoped at a later date to devote a paper to these. Two of the species listed, *Singa pygmaea* Sund. and *Zilla dioidea* Walck., have not been recorded previously from Surrey.

The usual methods of collection were employed—sweeping, beating, searching under bark and under stones, and pulling up grass tufts and shaking them over a white sheet. The majority of specimens collected were taken away alive and examined at leisure, and although this procedure entails the use of a large number of glass tubes it was considered preferable to plunging specimens directly into spirit in the field. Suitable specimens were selected for breeding and experimental purposes, the rest being killed in Ethyl Acetate and preserved in 70% alcohol to which a little glycerine had been added.

The relative frequencies: Abundant (A), Frequent (F), Occasional (O) and Rare (R) have been based mainly on data obtained in 1948 during (a) a search for Ichneumon parasites when 700 spiders were examined, and (b) during some population counts on Central Plain, Bayfield Plain and in S.E. and Central Woods when a total of some 800 spiders were observed. The data refer principally to spiders obtained by sweeping and beating, and as it is easier to assess the abundance of a species taken in this manner than to assess the numbers of a species living at the roots of grasses, the recorded frequencies of the swept and beaten species are likely to be nearer the correct value than the others. The extraction of the fauna from soil and grass samples by one of the recognized methods is to be undertaken later to obtain accurate data on the frequency of the ground-living spiders.

The nomenclature and order adopted is that given in Bristowe's "The Comity of Spiders," Vol. I (1939), but Clerck's names have been revived where necessary in accordance with a recent decision of the International Commission of Zoological Nomenclature.

Group: DICTYNOIDEA.

Spinners of meshed webs. Their carded silk appears to be, when fresh, of a far more tenacious nature than the viscid silk of the orb web spinners, and while highly efficient for retaining prey affords considerable protection against invertebrate enemies. It is a noticeable fact that there are no British records of Dictynids as prey of Pompilid wasps or as victims of Ichneumon parasites.

Fam.: DICTYNIDAE.

Dictyna arundinacea Linn. (F). Plains, fringes of ponds, in rides and clearings in woods. Spins a tangled web on the heads of grasses, etc.

D. uncinata Westr. (F). Similar situations to *arundinacea*. Spins webs on leaves and tips of low vegetation.

D. latens Fabr. Locally frequent in 1947 in Bayfield and Western Plains, but numbers considerably reduced in 1948 and restricted to one part of Bayfield Plain.

Lathys humilis Bl. (R). On dried heads of *Rumex* spp. East and Western Hollows.

Ciniflo ferox Walck. (R). Webs under rubble S.E. Wood and under stone Station Copse. Remains of beetles found in webs of this and other *Ciniflo* species.

C. similis Bl. (O). Hill House Wood webs under bark.

C. fenestralis Stroem. (O). On palings I.O.W. Enclosure, and on trees Mark Oak and Eastern Woods.

Group: DYSDEROIDEA.

The spiders of this "primitive" group are characterised by having only six eyes as compared with the normal eight.

Fam.: OONOPIDAE.

Oonops pulcher Temp. (O). In plant debris and at roots of grasses in plains.

Fam.: DYSDERIDAE.

Harpactea hombergi Scop. (F). All woods. A nocturnal hunting spider, but adult males often seen by day moving on tree trunks.

Segestria senoculata Linn. (R). Under bark, Central and Eastern Woods. A tube dweller.

Group: CLUBIONOIDEA.

With the exception of the Agelenidae the spiders of this group are hunting species.

Fam.: DRASSIDAE.

Drassodes lapidosus Walck. (O). Under stones, bark S.East and Central Woods and on Bayfield Plain. One example of variety *cupreus* Bl.

D. signifer C. L. Koch. (R). Beaten off oak, Central Wood, and in leaf debris, Eastern Wood.

Zelotes sp. One immature female found enclosed in white cell under a stone, Western Scrub.

Micaria pulicaria Sund. (O). Males very active on paths of plains in May and June.

Fam.: CLUBIONIDAE.

Clubiona terrestris Westr. (O). S.E. Wood, Eastern Wood and Central Plain.

C. stagnatilis Kulcz. (O). Woods, Eastern Plain, Station Copse.

C. neglecta Camb. (R). Central Plain, Eastern Hollow.

C. phragmitis C. L. Koch. (O). Woods, pond margins, Bayfield Plain.

C. pallidula Clerck (*C. holosericea* Linn.). (O). Pond margins, Central Wood, plains.

C. reclusa Camb. "With eggs in curled leaves near Sheepbell Farm" (W. S. Bristowe).

C. brevipes Bl. (O). Woods, Eastern Plain.

C. compta C. L. Koch. (F). All woods.

C. corticalis Walck. (F). All woods.

Cheiracanthium erraticum Walck. (F). All plains.

Agroeca brunnea Bl. (F). Plains, rides and clearings in woods. The characteristic egg sacs, which are to be found attached to grass stems are often much parasitized by Criptine ichneumons.

A. proxima Camb. Two empty egg sacs believed to be of this species found S.E. Wood on oak.

Phrurolithus festivus C. L. Koch. (R). Eastern Plain. An ant "mimic."

Zora spinimana Sund. (F). Plains, hedgerows. At roots of grasses and in bracken debris.

Fam.: ANYPHAENIDAE.

Anyphaena accentuata Walck. (A). All woods.

Fam.: THOMISIDAE ("Crab Spiders").

Misumena vatia Clerck (*M. calycina* Linn.). (F). On flowering plants in plains and woods. This spider is able to change its colour to suit its background. I have found white, pink and yellow specimens on flowers of similar colour and green specimens on oak. Preys on bees, flies and lepidoptera that visit the flowers.

Diaea dorsata Fabr. (O). On holly and oak, Central and Eastern Woods.

Xysticus audax Schr. (O). Plains.

X lanio C. L. Koch. (O). Eastern and Central Woods.

X. cristatus Clerck (*X. viaticus* Linn.). (F). Plains and fringes of Woods.

X. sabulosus Hahn. Three females were found on ant hills in Bayfield Plain used by rabbits as observation posts. The spiders evidently attracted to flies visiting the rabbit dung.

X. erraticus Bl. (O). Plains, woods fringing I.O.W. Pond.

Oxyptila trux Bl. (R). Eastern Hollow.

Oxyptila sp. Two immature females of a species not *O. trux*, from Central Plain.

Philodromus aureolus Clerck (*P. aureolus* Oliv.). (F). On hawthorn bushes in plains and fringes of woods.

P. a. caespiticolis Walck. (O). Subspecies. As above.

P. dispar Walck. (R). On bark of birch trees, Eastern Plain.

Tibellus parallelus C. L. Koch. (F). Pond and ditch margins and marshy areas.

Fam.: SALTICIDAE ("Jumping Spiders").

Salticus scenicus Clerck (*S. scenicus* Linn.). (O). On oaks near the meeting place by I.O.W. Pond.

S. cingulatus Panz. Recorded by W. S. Bristowe in his 1923 paper.

Heliophanus cupreus Walck. (O). Pond areas.

H. flavipes C. L. Koch. (R). Eastern Hollow.

Ballus depressus Walck. (F). On oak, most woods.

Neon reticulatus Bl. (O). In leaf debris and on oaks in woods.

Euophrys frontalis Walck. (F). Dryer parts of plains at grass roots.

Evarcha falcata Clerck (*E. blancardi* Scop.). (O). Hollows and S. edges of Central and Eastern Woods.

Fam.: LYCOSIDAE ("Wolf Spiders").

Lycosa amentata Clerck (*L. saccata* Linn.). (F). Bayfield, Eastern and I.O.W. Plains.

L. pullata Clerck (*L. pullata* Oliv.) (F). Plains.

L. lugubris Walck. (A). All woods.
L. monticola Clerck (*L. monticola* Sund.). (F). Central Plain.
Tarentula accentuata Latr. (O). Plains.
T. pulverulenta Clerck (*T. carinata* Oliv.). (O). Plains.
Trochosa ruricola De Geer. (O). Plains.
T. terricola Thor. (F). Plains, bracken areas.
Pirata piratica Clerck (*P. pirata* Oliv.). (A). Around pond margins and in wetter parts of plains in spring.

Fam.: PISAURIDAE.

Pisaura mirabilis Clerck (*P. listeri* Scop.). (A). All plains, rides and clearings in woods. Often noticed with lepidoptera larvae as prey—on one occasion the "distasteful" larva of the Cinnabar moth.

Fam.: AGELENIDAE ("Sheet Web Spinners").

Amaurobius atropos Walck. (O). Central and S.E. Wood.
Tegenaria atrica C. L. Koch. One female in web at base of a tree, Station Copse.
T. domestica Linn. "In sheds adjoining a house near Sheepbell Farm" (W. S. Bristowe).
T. silvestris C. L. Koch. (O). Banks in Central and Eastern Woods.
Agelena labyrinthica Clerck (*A. labyrinthica* Linn.). Abundant in 1947, less common in 1948. Plains, East and Western Hollows.
Hahnia sp. An immature female from grass roots, Bayfield Plain, June 1947.

Group: ARGYOPOIDEA.

Nearly all the members of this group are web spinners.

Fam.: TETRAGNATHIDAE.

Tetragnatha extensa Linn. (A). Pond areas, plains, marshy areas. The spiders of this genus are orb web spinners.
T. montana Sim. (O). Pond areas.
T. obtusa C. L. Koch. (O). Eastern and Central Woods.
Pachygnatha degeeri Sund. (O). Plains, under stones. Spiders of this genus do not spin webs.
P. clercki Sund. (O). At grass roots in plains.

Fam.: ARGYOPIDAE ("The Orb Web Spinners").

Meta segmentata Clerck (*M. reticulata* Linn.). (A). All plains, rides and clearings in woods. The spider most frequently encountered during sweeping.
M. merianae Scop. (O). The deeper, damper parts of Central and Eastern Woods. Exceptionally dark specimens were found in a gun pit, covered with vegetation, on Eastern Plain, 1947.
Cyclosa conica Pall. (F). Eastern Wood.
Singa pygmaea Sund. (R). South East Wood.
Araneus gibbosus Walck. (O). Central and Eastern Woods.
A. diadematus Clerck (*Aranea diadema* Linn.). (R). Only four specimens of the Common Garden Spider were seen—all on Bayfield Plain.
A. cucurbitinus Clerck (*Aranea cucurbitina* Linn.). (A). Plains and fringes of woods. Much subject to attack by Ichneumon parasites. From a Bookham specimen I bred out the Pimpline *Polysphincta tuberosa* Grav.
A. triguttatus Fabr. (R). S.E. Wood.
A. redii Scop. (F). Pond areas and Plains.
A. umbraticus Clerck (*Aranea sexpunctata* Linn.). (O). Central and Eastern Woods.
A. quadratus Clerck (*Aranea reaumuri* Scop.). "Amongst grass in open space opposite Sheepbell Farm" (W. S. Bristowe).
A. cornutus Clerck (*Aranea foliata* Fourc.). (F). Plains, in marshy areas and along banks of streams and ditches.
Zilla dioidea Walck. A flourishing colony in Eastern Hollow.

Mangora acalypha Walck. A small colony in Eastern Hollow—normally associated with heather.

Zygiella x-notata Clerck (*Z. litterata* Oliv.). (O). Railings near Railway Station.

Z. atrica C. L. Koch. (O). Eastern Plain, S.E. Wood.

Fam.: THERIDIIDAE (Spinners of "Scaffolding Webs").

Theridion formosum Clerck (*T. lunatum* Oliv.). (O). Eastern and S.E. Woods.

T. vittatum C. L. Koch. (F). Woods.

T. sisyphium Clerck (*T. notatum* Linn.). (F). Woods.

T. varians Hahn. (O). Woods.

T. tinctum Walck. (O). Woods.

T. pictum Walck. (O). Woods.

T. bimaculatum Linn. (F). Plains.

T. denticulatum Walck. (O). Central Plain.

T. pallens Bl. (F). On oak, all woods.

T. ovatum Clerck (*T. redimitum* Linn.). (F). Hawthorn scrub in plains, fringes and rides of woods. All three colour varieties seen.

Stearodea bipunctata Linn. (O). Station Copse. Hill House Wood.

Robertus lividus Bl. (R). Roots of grasses, Eastern Plains.

Nesticus cellulanus Clerck (*N. cellulanus* Oliv.). (R). Gun pit on Eastern Plain, and in Central Wood.

Fam.: MIMETIDAE.

Ero furcata Vill. (F). At grass roots in plains. Preys on Theridiids and other small spiders.

TABLE A.

Family.	Total No. of species	Central Wood	Eastern Wood	Hill House Wood	Markoak Wood	S.E. Wood	Stent's Wood	Station Copse	Bayfield Plain	Central Plain	Eastern Plain	I.O.W. Plain	Western Plain	E. & W. Hollows	Pond Margins
Dictynidae	7	1	2	1	1	2	—	1	3	2	2	2	3	3	2
Conopidae	1	—	—	—	—	—	—	—	1	1	1	1	—	—	—
Dysderidae	2	2	2	1	1	1	1	—	—	—	—	—	—	1	—
Drassidae	4	3	1	—	—	1	—	—	2	1	—	1	1	—	—
Clubionidae	13	7	5	3	5	5	4	2	5	5	7	4	3	3	4
Anyphaenidae	1	1	1	1	1	1	1	—	1	1	—	—	—	—	1
Thomisidae	13	4	4	1	1	3	1	—	7	6	4	3	4	6	5
Salticidae	7	3	3	2	1	2	1	1	1	1	1	—	1	3	2
Lycosidae	9	3	3	1	1	3	1	1	6	4	4	4	4	3	3
Pisauridae	1	1	1	1	1	1	1	—	1	1	1	1	1	1	1
Agelenidae	5	2	1	—	—	1	—	1	2	1	1	1	—	1	—
Tetragnathidae ...	5	1	1	—	1	1	—	—	3	3	2	2	1	2	2
Argyopidae	15	6	6	2	2	5	2	2	5	5	6	3	3	6	4
Theridiidae	13	7	8	5	5	8	3	3	3	4	5	3	2	6	5
Mimetidae	1	1	—	—	—	1	—	—	1	1	1	1	—	1	—
	97	42	38	18	20	35	15	11	41	36	35	26	23	36	29

4. DISTRIBUTION.

Table "A" shows the distribution of families and species as recorded to date, but as some parts of the Common have not been worked to the same extent as others, a detailed discussion of this subject will be left for a future occasion when the distribution of the Linyphiidae may also be taken into account. A few points, however, may be noted here.

Seven families of British spiders representing 9 species are not shown in the systematic list—the Atypidae, Eresidae, Uloboridae, Scytodidae, Pholcidae, Sparassidae and Oxyopidae. With one, or perhaps two, exceptions these nine species are not likely to be met with on the Common. The Sparassid, the green *Micrommata virescens* Clerck may be found in the future, but I do not think Bookham provides the right type of soil in the right kind of situation for Britain's single Mygalomorphid spider (*Atypus affinis* Eichw.) to burrow in. A search of the ponds for the Water Spider *Argyroneta aquatica* Linn. has not been made as yet, but both Lt.-Colonel C. J. F. Bensley and Major J. L. Harrison have informed me that they have not encountered this species while investigating the mollusca of the ponds.

The effect of fires and flooding has been noticeable. The burning of the plains in March 1948 is believed responsible for the severe reduction in numbers of *Dictyna latens* Fabr. and *Agelena labyrinthica* Clerck in that year. In wet springs the young of the Lycosid *Pirata piratica* Clerck range wide over the flooded plains and have been found in most of the gun pits, but as the year advances adults are restricted to the standing water of the ponds.

Bristowe (1939) summarizes some of the factors that influence the distribution of species by environments—"Maximum temperature, minimum temperature, the temperature at particular seasons, the length of the seasons, the rapidity and extent of temperature ranges, humidity, rainfall, light intensity, wind, the physical properties of the soil, the nature of the vegetation, etc., . . ."

MacFadyen (1949) has pointed out another factor, "the colour as well as the intensity of sunlight becomes important—it may be green under a screen of leaves." The nature of the supporting structure for their webs strongly influences the choice of site of many spiders. In this connection I would draw attention to a fact, which I have not seen recorded elsewhere, the preference shown by a Theridiid *Theridion formosum* Clerck for old trees with deeply fluted trunks. At only one station in the London Area have I found *formosum* very abundant—in Epping Forest where the old pollarded hornbeams provide such a habitat. An explanation of the considerations involved in this preference will be given at another time.

The distinctive little Argopid *Zilla dioidea* Walck., discovered in Eastern Hollow, is believed to be a newcomer to the Common, and its future status will be carefully studied. Observations in Hampshire and elsewhere have led me to regard *Zilla*, a southern species, as one that is in process of extending its range. The gradual warming up of the world's climates has been noticed by many observers and commented upon by Siefert (1949), and it is interesting to speculate whether this is responsible for the north-easterly spread of *Zilla*. The recent discoveries of such southern species as *Scytodes thoracica* Latr. at Cambridge by Dr. J. L. Cloudsley-Thompson (1949), and of *Phaeocedus braccatus* L. Koch (Ranmore, Surrey) and *Dipoena tristis* Hahn. (Oxshott, Surrey) by myself add point to this speculation.

5. Proposed Future Work.

Towards the end of 1947 when a general idea of the spider fauna had been formed a programme of ecological work was planned, all of which was to centre around the spiders of the genus *Araneus* Clerck (Fam.: Argyopidae).

A genus of orb web spinners was selected as the subject for ecological study in preference to a genus of hunting spiders for the following reasons:—

(a) Orb web spinners are to a great extent static and conspicuous;
(b) The number of individuals in a given area can be assessed quickly by simple collecting methods such as sweeping or beating;
(c) The nature of the prey which constitute the food supply may be seen by a study of the spiders' webs.

The genus *Araneus* was selected because

(d) The Bookham species form a compact group exceeding in numbers those of any other genus of Argyopids represented at Bookham yet it is not so large as to be unwieldy;
(e) The eight species are readily distinguishable in the field one from the other by shape, colour or "folium" marking of the abdomen alone. *Gibbosus* has prominent humps; *umbraticus* is flattened in form; *cucurbitinus* is green while *cornutus* is pale and sometimes almost white in colour; *diadematus* has the familiar white cross pattern; *quadratus* has conspicuous white oval patches; *redi* has its abdomen blazoned with a dagger, and the little *triguttatus* with a broad reddish diamond marking.

These considerations—static nature, conspicuousness, ease of collection, identification and observation help to smooth the way of the field worker and reduce his demands on the laboratory and the microscope.

It is planned to make two problems the main long-term studies, namely "Parasitism" and "Population fluctuations", but several others are to be investigated as short-term studies. The features of the programme are:

(i) *Population Fluctuations.*

Monthly population counts taken over a number of years at three or four stations are to be made not only of the *Araneus* spp. but also of the other web spinners (Argyopids and *Tetragnatha* spp.) likely to compete with them in the same habitats; climatic conditions prevailing during the period of survey to be studied in relation to the data obtained; any significant trend noticed to be made the subject of special study.

Closely linked with this will be an attempt to discover what are the differences in their ecology that permit *redi* to compete successfully with *Meta segmentata* Clerck and *gibbosus* with *Cyclosa conica* Pall. in the same habitats.

(ii) *Parasites.*

A preliminary note on this subject is given below. The search for parasites will accompany the population counts, but will be intensified during the peak infestation periods.

Other enemies will be studied, notably the Pompiliid and Trypoxylonid wasps. It is hoped to induce a hymenopterist to study the species and distribution of these enemies at Bookham.

(iii) *Webs.*

The differences in the structure of the webs of each species, and the variation in detail of webs of spiders of the same species and at different times of the year will be noted. Attention will be paid to the positioning of the webs in different habitats. A long series of web samples will be collected using the simple procedure described by Comstock (1913).

Lists of the prey found in webs over a season are to be prepared. As these will mainly consist of diptera the co-operation of the dipterists will be needed and I am happy to state that the assistance of Mr. L. Parmenter in this matter is assured. A special note is to be made of the presence of frailer dragonflies (Zygopterids) in the webs of *A. cornutus* Clerck, as I believe these Odonata at certain periods of the year form an appreciable, if small, part of the spider's diet.

(iv) *Distribution.*

Maps showing the distribution of each species were begun in 1948, and will be prepared annually. The particular problem of plant preferences will be investigated—why does *triguttatus* show a marked preference for oak, what are the inducive factors?

It is hoped that this scheme of work will interest other members. If helpers are forthcoming an attempt will be made, at the resumption of the survey, to provide them with an annotated key to the Argyopidae and a sample set of named specimens.

6. Parasites of Bookham Spiders.

Acari.—A sickly specimen of *Araneus umbraticus* Clerck was found (Oct. 1947) to be infested with a species of Gamasid mite. This was considered to be a case of parasitism and not of phoresy.

Diptera.—Two species of Cyrtid flies (*Acrocera globulus* Panz. and *Oncodes pallipes* Latr.) have been recorded from Bookham by Parmenter (1950). The larvae of these rather local flies are endoparasites of spiders, usually of hunting spiders (Lycosids, Clubionids, Salticids). I was unable to detect evidence of Cyrtid parasitism at Bookham but recognition of infestation in the field is difficult. Only by keeping a large number of spiders, preferably Lycosids, in captivity would it be possible to obtain some idea of the prevalence of these parasites. Mr. L. Parmenter (*in litt.*) tells me that the flight period of these flies in Britain lies between 23rd June and 13th August, so that the most favourable time to collect Lycosids for observation would be in May. There are very few British records where both the spider host and its parasite have been identified. The researches of Millot (1938) have thrown much light on the larval development of these flies but much remains to be learnt of the effect the parasite has on the normal activities of the spider.

Ichneumons.—Bristowe (1941) believes that "ichneumons as a check to the multiplication of the British spider population as a whole, come second amongst invertebrate enemies (first place being awarded to spiders themselves)." It was noted in 1947 that two peak periods of infestation occur during the year, in the eight weeks from the middle of April to the middle of June and again in late July and August. In 1948 and 1949 I made sample counts of ichneumon parasites at various localities during the spring infestation in the attempt to assess roughly the incidence of Pimpline parasitism as a basis of comparison for the projected study into the parasites of the genus *Araneus* at Bookham.

The search for ectoparasites was made in the field, a simple routine being adopted. Spiders were collected by sweeping grass and the low vegetation on the fringes of woods. Each spider was tubed individually. Sweeping continued until a fixed number of tubes (fifty) was filled. The spiders were then examined with a pocket lens, and if free of the parasite released. The cream-coloured ichneumon larva is normally to be seen clinging to the front dorsal surface of the abdomen. I have, however, on one occasion found the larva attached to the cephalothorax. When the contents of the fifty tubes had been examined and particulars of the samples recorded, the procedure would be repeated elsewhere. With the help of a notetaker the whole operation can be carried through in a relatively short time.

TABLE B.

Location.	Date.	Examined.	Parasites.	Percentage.
Bookham (Surrey)	April-June 1948	700	9	1.28
Ranmore (Surrey)	May-June 1948	300	7	2.33
Oxshott (Surrey)	May 1948	100	0	0.00
Eynsford (Kent)	April-May 1948	550	4	0.73
Shoreham (Kent)	April-May 1948	350	2	0.53
Epping (Essex)	April 1948	100	1	1.00
Farley Down (Hants.)	April 1949	450	7	1.55

It is not intended in this note to make a detailed analysis of the results obtained, but it will be seen from Table B that of 2550 spiders examined, 30 (or 1.17%) were found to carry an external larva.

Host species were *Meta segmentata* Clerck 4 (1); *Araneus cucurbitinus* Clerck 11 (5); *A. redi* Scop. 3 (1); *A. diadematus* Clerck 2; *A. quadratus* Clerck 1; *A. cornutus* Clerck 1; *Theridion varians* Hahn. 2 (1); *T. sisyphium* Clerck 1; *Theridion* sp. 1; *Linyphia* spp. 3 (1); *Clubiona* sp. 1. (The figures in brackets refer to Bookham).

Sexes of hosts: 29 ♀♀, 1 ♂.

The percentage of 1.17 should be regarded cautiously for the following reasons:—Sampling was on too small a scale, no effort was made to sample the late autumn brood of parasites, and sampling by sweeping overlooks the vast population of ground living spiders. As a percentage for the whole spider population it is much too high and further research is necessary before one can accept the figure as true for the spiders encountered by sweeping grasses and low vegetation. The figures do substantiate what was already well known that the two families of web spinners (Argyopidae and Therididae) and the Linyphid genus *Linyphia* suffer most from the attacks of Pimpline ichneumons. Males being smaller and more active than females suffer less than their sedentary mates.

Nielsen (1923) stated that unless the spiders were fed the larvae cannot increase in size. My own observations tend to confirm Bristowe's opinion that this is not the case. A number of unfed parasitized spiders were kept under observation. In every instance the larva grew steadily and a few of the parasites were bred to imagines. It would appear that a certain minimum size for the host, dependant upon the species and perhaps on the sex of the parasite, is necessary for the ichneumon to complete its development under these conditions.

Ichneumons predatory upon spiders' eggs perhaps play a greater part in the controlling of the spider population than do the ectoparasites, but no special attention has as yet been given to these at Bookham.

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Footnote: Since this paper was written Vol. I of "British Spiders" by G. H. Locket and A. F. Millidge has been published by the Ray Society. This, the first major work of its kind published in Great Britain since O. Pickard-Cambridge's "Spiders of Dorset" (1879-81), points out that the family name GNAPHOSIDAE should be substituted for DRASSIDAE and the genus *Nesticus* should be removed from the family THERIDIIDAE to the family NESTICIDAE.—A.E.L.G.

Further Notes on the Vegetation of Gun-pits in Eastern Plain, Bookham Common.

By E. B. BANGERTER and C. P. CASTELL.

IN the "London Naturalist" for 1948 we published our first "Notes" on the Eastern Plain Gun-pits, giving a list of species constituting their flora and a general account of each pit. During the two seasons that have elapsed since then we have several times visited the pits to make further notes and observations, which are summarised in the appended list. This shows species in the original list now observed in pits that lacked them up to 1948 and species not previously recorded for any pit. An analysis for vascular plants is given here as follows:—

Pit.	No. of species in original list.	No. added.	Total.
A	4	11	15
B	18	10	28
C	15	3	18
C.P.	12	2	14
D	13	3	16
E	12	10	22
F	9	1	10
G	5	5	10
H	2	6	8
J	23	7	30

Total number of species added since 1948 = 11.
Total number of species recorded for all pits = 63.

This analysis indicates that the ratio of species is, on the whole, maintained; pits B and J, near Common Road, have still the richest flora, whereas G and H on the border of S.E. Wood have the poorest. Colonisation is still mainly from the plain rather than the wood. Pits F, D and C in the open plain have very small increases indicating that position has regulated the rate of colonisation to some extent. Pit E, also on the border of S.E. Wood but nearer to Common Road, has a fair increase, particularly of grasses. It is interesting to note, however, that Pit A, with only *Juncus* spp. originally, has the greatest increase with eleven additional records, two of which are true aquatics, *Lycopus europaeus* and *Glyceria fluitans*, which have not been noted from the plain itself. This pit is the nearest to I.O.W. Pond and it must be inferred that colonisation by these two species has taken place from that direction (perhaps by means of birds).

The analysis also shows that eleven species have been added to the original list, including, in addition to the two aquatics noted above, two others new to E. Plain, viz., *Juncus tenuis* (Pit B) and *Scirpus setaceus* (Pit J).

It has not been possible to check critical species yet, but specimens of *Mentha* shown to Mr. R. Graham have been passed as *M. arvensis*, and Dr. W. R. Philipson has determined specimens of *Agrostis* as *A. canina* (type and var. *fascicularis*) and *A. tenuis*. *Juncus articulatus s.l.* of our previous list may be taken as *J. articulatus s.s.* (=*lampocarpus*). It is interesting to note that the creeping variety *fascicularis* of *Agrotis canina* has appeared in four more pits although it has not been noted from the plain itself. *Potentilla erecta* has now colonised all the pits, thus proving itself a ready coloniser like *Juncus effusus*. *Salix* sp. in Pits E and J is the only increase observed for tree species; it is hoped to work out willows in more detail this season.

Mr. A. H. Norkett recorded a Bog Moss, *Sphagnum* sp., for Pit J in September 1950. The specimen was young, but was probably *Sphagnum auriculatum* var. *canovirescens* Warnst., which occurs in Eastern Ditch, and in one or two wet places on Eastern Plain. It is surprising that it should not have appeared in Pits C and D, which are much nearer to its known places of occurrence.

Authorities for specific nomenclature have been omitted in the list as Clapham's " Check List " is followed.

We regret that three records, referred to in the text of our previous paper, were inadvertently omitted from the floristic list, which should be amended as follows:—" *Rubus* sp." to be added after " *Lotus uliginosus* " and marked for Pit G; " *Mentha* sp. (? *arvensis*)" marked for Pit C; " *Betula* spp." marked for Pit H. These amendments have been taken into account in the preparation of the present synopsis and list.

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	A	B	C	D	E	F	G	H	J
Ranunculus flammula	+	–	–	–	–	–	–	–	–
Ranunculus repens	–	+	–	–	–	–	–	–	–
Viola riviniana	+	–	–	–	–	–	–	–	–
Sagina procumbens	–	+	–	–	–	–	–	–	–
Hypericum humifusum	–	–	–	–	–	+	–	–	–
**Ulex nanus*	+	–	–	+	–	–	–	–	–
Trifolium dubium	–	+	–	–	–	–	–	–	–
**Trifolium repens*	–	+	–	–	–	–	–	–	–
Lotus uliginosus	–	–	–	–	+	–	–	–	–
**Potentilla procumbens*	–	–	P	–	–	–	–	–	–
Potentilla erecta	+	–	–	–	–	–	–	+	–
**Lonicera periclymenum*	+	–	–	–	–	–	–	–	–
Galium saxatile	–	–	–	–	+	–	–	+	–
Galium palustre	–	–	–	–	–	–	+	+	–
Galium uliginosum	–	–	–	–	–	–	–	–	+
Succisa pratensis	+	+	–	–	+	–	–	–	–
Gnaphalium uliginosum	–	–	–	–	–	–	–	–	+
Cirsium palustre	+	–	–	–	–	–	+	+	–
**Cirsium arvense*	–	–	P	–	–	–	–	–	–
**Calluna vulgaris*	+	+	–	+	+	–	–	–	–
Mentha arvensis	–	–	+	–	–	–	–	–	–
**Lycopus europaeus*	+	–	–	–	–	–	–	–	–
Salix sp.	–	–	–	–	+	–	–	–	+
**Juncus tenuis*	–	+	–	–	–	–	–	–	–
Juncus conglomeratus	–	–	–	–	–	–	+	+	–
Juncus articulatus	–	–	–	–	–	–	–	–	+
**Scirpus setaceus*	–	–	–	–	–	–	–	–	+
**Carex ovalis*	–	–	–	–	–	–	–	–	+
Agrostis canina	–	+	–	+	+	–	–	–	+
Agrostis canina v. *fascicularis*	–	+	+	–	–	–	+	+	–
Agrostis tenuis	–	–	–	–	+	–	+	–	–
Holcus lanatus	+	–	–	–	+	–	–	–	–
Molinia caerulea	–	+	–	–	+	–	–	–	–
**Glyceria fluitans*	+	–	–	–	–	–	–	–	–
Pteridium aquilinum	–	–	–	–	+	–	–	–	–
Equisetum arvense	–	–	+	–	–	–	–	–	–
Sphagnum sp.	–	–	–	–	–	–	–	–	+

*denotes species not recorded for any pit in the original list.

P denotes species occurring on parapet but not on floor of pit C.

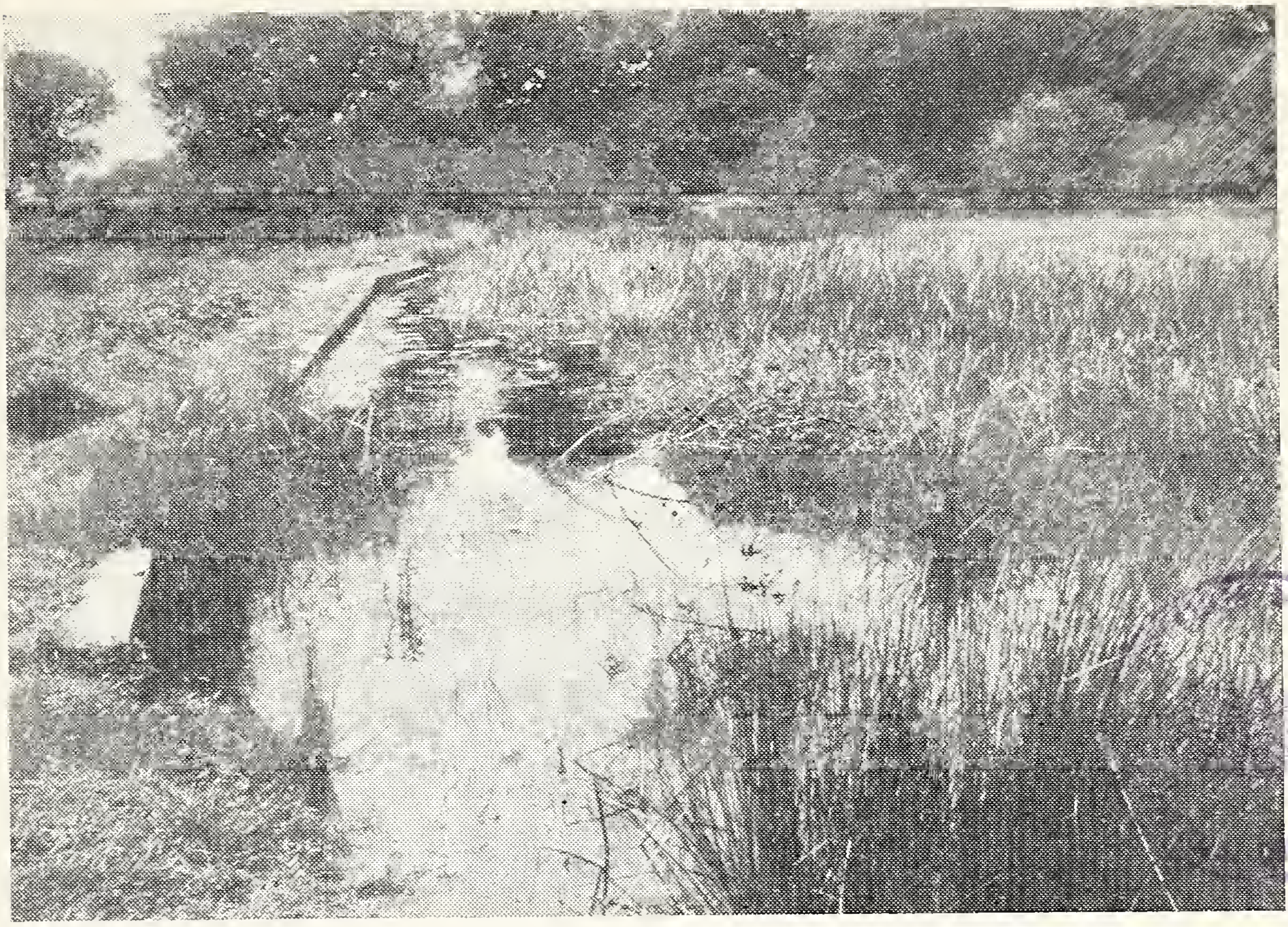


Fig. 1. *Photo. C. P. Castell.*

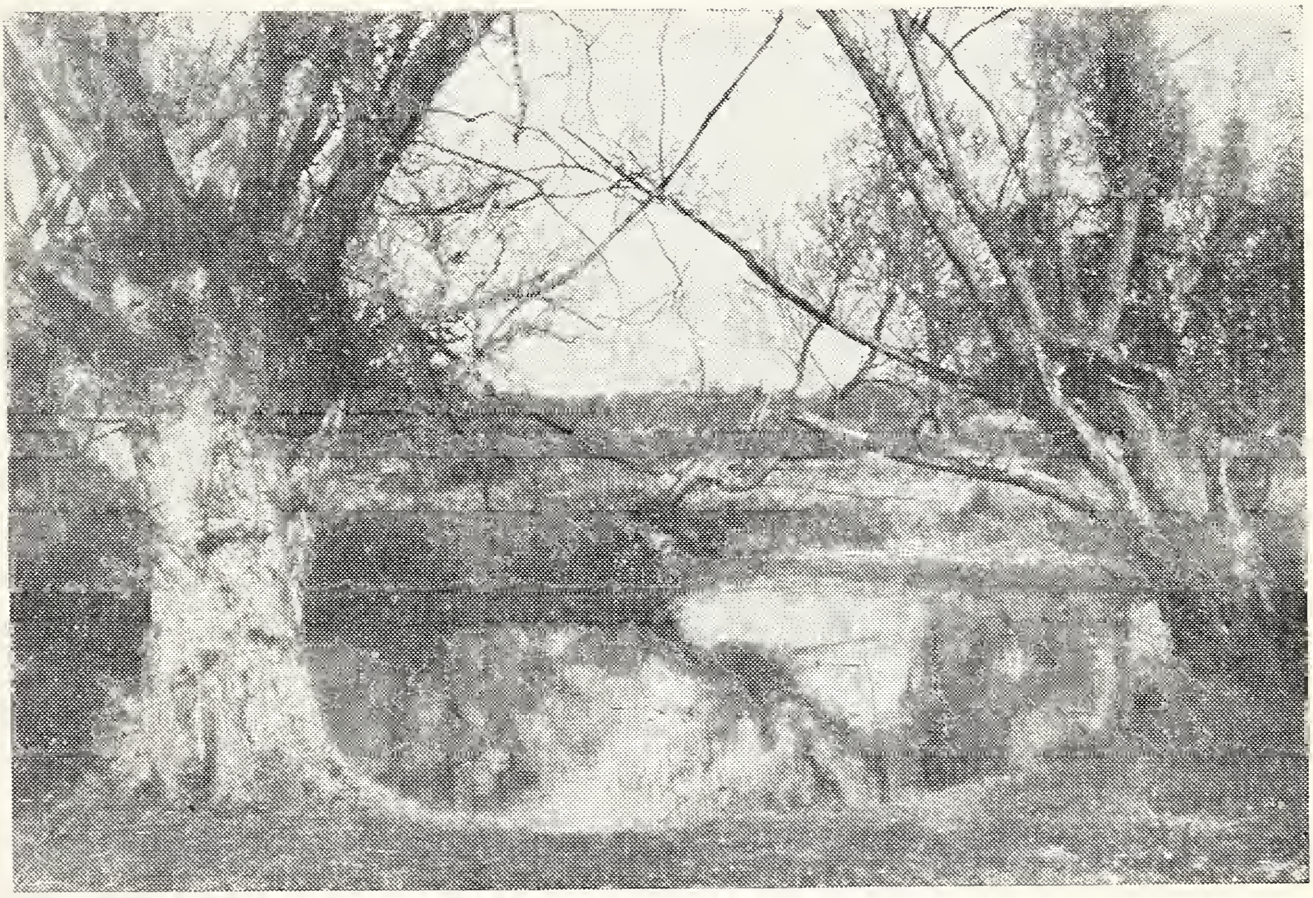


Fig. 2. *Photo. K. P. Keywood.*

Fig. 1. The Isle of Wight Pond, Bookham Common, Western End, June 1949, after repair of embankment. *Juncus effusus* in foreground, *Sparganium erectum* and *Equisetum limosum* behind. The outflowing ditch on the left is a habitat for *Nasturtium microphyllum*. The survey team's lunch-place is on the grassy slope at the back. See *L.N.*, No. 24, pp. 18, 22, 25.

Fig. 2. Bayfield Pond, Bookham Common, Eastern End, April 1948. The Crack Willows (*Salix fragilis*) are over 80 years old. This pond is opposite the tea-place (formerly Bayfield). See *L.N.*, No. 24, pp. 19, 26.

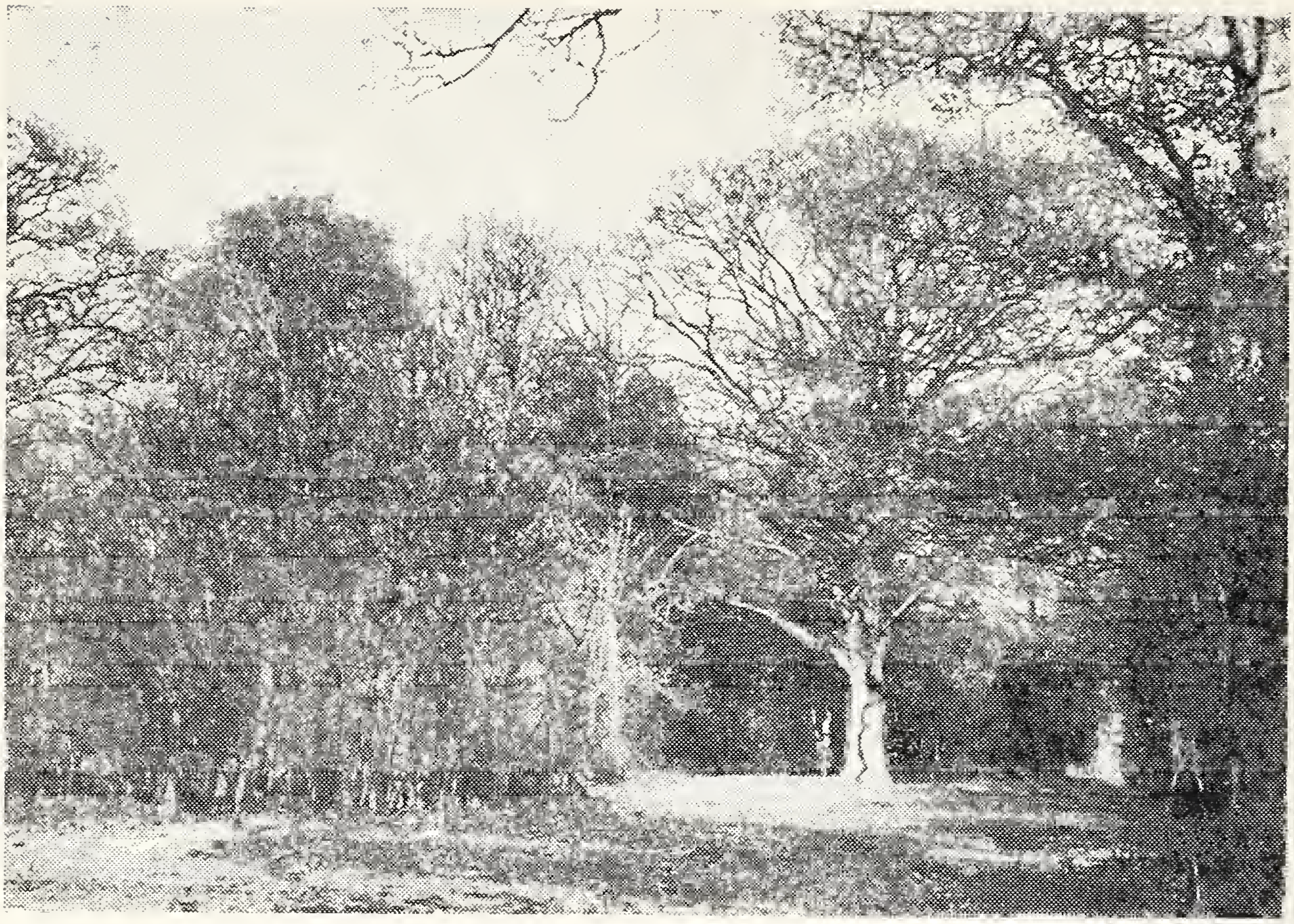


Fig. 3.

Photo. C. P. Castell.

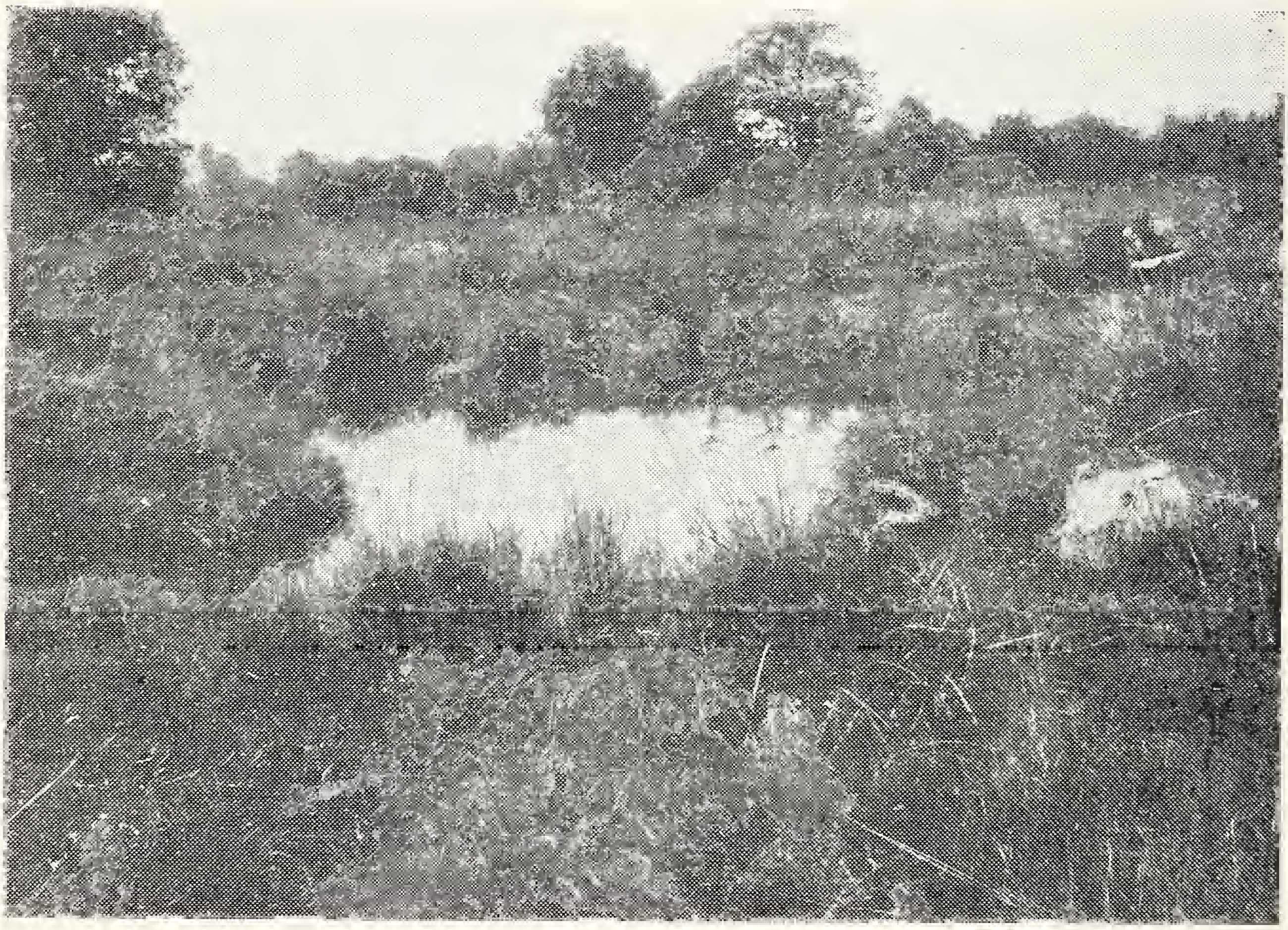


Fig. 4.

Photo. C. P. Castell.

Fig. 3. South Eastern Wood, Bookham Common, May 1940. Note the dense masses of young oaks. See *L.N.*, No. 26, p. 82.

Fig. 4. Gun Pit C, Eastern Plain, Bookham Common, June 1949, still showing about two feet of water. *Molinea caerulea* and *Juncus effusus* in foreground and *Pteridium aquilinum* behind the pit. See p. 54, and *L.N.*, No. 28, p. 52.

The Bird Population of an Oakwood in Surrey (Eastern Wood, Bookham Common).

By Geoffrey Beven.

THE Ecological Section has been carrying out a survey of the birds of Eastern Wood since 1946, and it is time that an interim report was issued. The section meets at Bookham officially only once a month, with a few extra afternoon meetings in the summer, and although further visits are made independently by members, the time available is much too short for research on an ambitious scale. The general objects of this study have therefore been limited to certain rather simple problems and general relationships. The main objects were to discover:—

(i) The distribution and density of territories of the breeding species.

(ii) Minimum figures for the summer and winter populations, and some indication of the variations in population throughout the year.

(iii) The correlation, if any, between the distribution of territories and variations in the nature and density of the trees and secondary growth.

Habitat. Eastern Wood is a sample of the woodland of Bookham Common. It is not necessarily a typical area and close comparison with other parts should undoubtedly be made. It is surrounded by woodland but is well demarcated by a series of footpaths and rides. There are two ponds at its southern boundary. The area is about 40 acres in extent, of which about 2 acres are open rides or spaces, and the remainder is a typical semi-natural pedunculate oakwood on a damp clay soil. The vegetation of the woodland at Bookham has been indicated in broad outlines by Steele (1947). But even in such a small area there is considerable variety in the density and type of both the trees and the secondary growth. This is indicated in Figure I and Table I. The latter gives counts of sample areas, each of 800 square yards, and an estimation of the total areas which the samples represent. (Two samples each of 400 square yards were examined for each main area, except one where only one sample was made, and the numbers of trees and bushes in this sample were doubled to make it comparable with the others). The Map (Figure 1) shows the distribution of these different areas in the woodland in February 1950. The main areas thus sampled may be briefly indicated:—

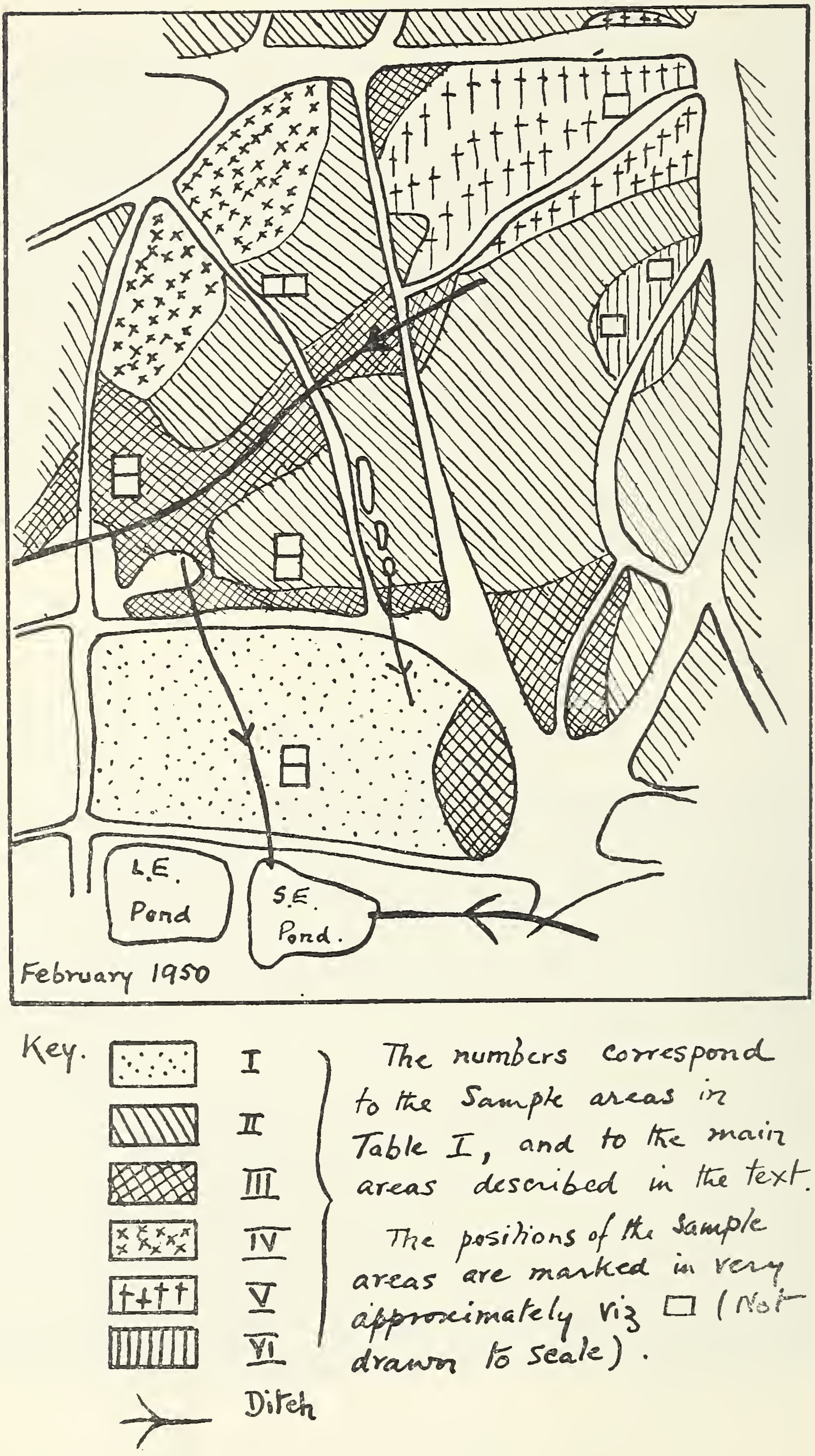
I. *Sparse Hawthorn.* Very sparsely scattered shrub with locally dense bracken with scattered brambles and rose. About equal proportions of young and mature oaks

II. *Moderate Hawthorn.* A little hawthorn and hazel, patches of bracken and abundant rose and honeysuckle. Moderate proportion of oaks mostly young.

III. *Dense Hawthorn.* This contains dense continuous hawthorn thickets. Willows locally abundant. Brambles and honeysuckle abundant. Very little bracken.

Figure 1.

VEGETATION MAP OF EASTERN WOOD.



February 1950

The numbers correspond to the Sample areas in Table I, and to the main areas described in the text.

The positions of the sample areas are marked in very approximately viz ☐ (Not drawn to scale).

Table I.

THE VEGETATION OF THE WOOD

(See also descriptions in the text).

SAMPLE (800 square yards).	Area (acres)	Month of Survey.	NUMBER OF TREES.									MAIN GROUND VEGETATION.				
			Oaks													
			More than 1 foot diam.	Less than 1 foot diam.	Total	Birch	Beech	Hawthorn	Hazel	Willow	Holly	Bracken	Rose	Bramble	Honeysuckle	Remarks
I	7	Dec. 1948	12	13	25	4	0	5	1	2	1	P D 3·4	S 2	S 2	—	
II	15	Dec. 1948	5	27	32	0	0	8	3	0	0	P 3·4	A	S ½-1	A	Bracken mainly sparse, but dense over ¼ of area.
III	6	Jan. 1949	12	30	42	0	0	50-75	7	32	0	nil	S	A	A	Hawthorn continuous thicket over ⅜ of area, 4-10 ft. high.
IV	3	Jan. 1949	9	38	47	10	0	7	86	1	0	T	—	T	—	Mainly open and bare.
V	1	Feb. 1949	3	22	27	22	2	26	61	0	0	—	—	T	T	Floor open and almost bare.
VI	5	Feb. 1949	6	0	6	2	0	2	160	2	0	nil	—	A	T	Dense Hazel, some bare areas.
Total ...	38															

Key to Symbols in Ground Vegetation Section

Figures = Approx. height in feet

P = Patchy S = Scattered A = Abundant D = Dense T = Thinly Distributed

IV. *Hawthorn-Hazel.* Abundant hazel scrub. Moderate birch and hawthorn. Predominance of young oak. Bracken thinly distributed. Little ground vegetation. *Quercus cerris* locally numerous in N.W. corner.

V. *Dense Hazel.* Sparse mature oaks with little ground vegetation.

VI. *Birch-Hazel.* Moderate oak, mostly young. Floor open, almost bare.

Method. This is based on that used by Chapman (1939). The observers walk about the wood, covering the whole area, and record on a large scale map (1:2500) the approximate position and numbers of every bird encountered, whether identified or not. Notes on the sex and song-posts and everything bearing on nesting are entered at the same time. Any other points of interest are also included, although they may not be required for the present investigation. This is done at every visit and different sections of the wood are worked by various members. Any birds noted are recorded on the map irrespective of whether they are in the observer's allotted section of the wood, as he may well have to cross another section to get to his own. An area may be covered twice by the same or a different observer but birds of species already recorded there are not included again, unless there is clear evidence that there are more than were originally counted. This results in a more thorough search of the area. At the end of each day the various maps are amalgamated. It is usually clear when the same bird has been recorded by more than one observer, but where there is doubt the bird is still only counted once, so that the results represent a minimum population figure and are almost certainly less than the true population. The counts were mainly done in the morning between about 11 a.m. and 2 p.m. G.M.T. Disturbance factors such as visits of people and picnic parties in this part of the Common are on the whole quite few, and probably do not interfere seriously with the results of the counts.

From these combined maps it is possible to form an estimate of the total numbers of birds for each visit, and also for the numbers of each species (with a small error for those unidentified). From a study of the constant position of " singing males," it is possible to map out the distribution of territories for the more numerous and important breeding species. In doing this a knowledge of the area and the conditions of observation is most important, and the final map of territories is made only after a careful consideration of the data obtained throughout the breeding season. A singing male observed on only one occasion in one spot is ignored (from the point of view of territory) as it may be a wandering male. Any information on pairing or nesting is collected. In estimating the number of territories, a separate map is made for each species, and every record of an individual, during the breeding season, is inserted in its approximate position. Where birds are heard singing every effort is made to locate the positions of neighbouring singing males in the field, as it is when one male sings that males in adjacent territories tend to sing also; and in this way many territories may be mapped, and confirmed by more than one observer independently, on subsequent visits later in the season. Maps of each species are made early in the breeding season, so that they can be taken into the field and doubtful points checked.

Results.

1. *Territories of Singing Males.*

In Table III are approximate figures for the number of territories in the 40 acres, for 6 different species. A territory which was only partly inside the area and partly outside, is counted as a half in the table, although in fact the proportion actually inside Eastern Wood may have been more or less than that. It is felt that although these figures are only approximate, they do give some idea of the density of territories for the species. Too much importance should probably not be attached to the variations from year to year.

Table III. TERRITORIES OF SINGING MALES.

Number of Territories in 40 acres.

	N.B. Part of a territory is counted as ½ in this table.				
	1946	1947	1948	1949	1950
Robin	24½	19	24	22½	28
Wren	—	—	11	17	20
Willow Warbler ...	—	—	—	16½	21
Chiffchaff	—	—	—	1	2-3
Blackbird	4	—	—	5	9
Chaffinch	5-7	—	—	9½	11

Where there are no figures in the columns, no counts for that particular species were made that year.

In considering the results it is important to bear in mind that more visits were made and more intensive work was done in Eastern Wood in 1950 than in the previous years, and the larger figures may not represent a corresponding increase in the population. There does seem however to have been a slight drop in the number of Robin territories in 1947, following the severe winter of 1946-7, but it may well be that the results are not significant, in view of the variations shown subsequently. In 1948 there were less visits in the breeding season and this may account for the smaller number of Wrens. It is important to realise that the presence of a singing male does not mean the presence of a pair. Lack (1937) points out that unmated males tend to sing more prominently than mated ones. The song of the latter often decreases

TABLE II. TABLE SHOWING ACTUAL COUNTS MADE OF THE WHOLE OF EASTERN WOOD DURING 1949 AND 1950.

		1949											1950																			
Handbook No.	Species	January 9	March 13	April 10	May 8	June 12	July 10	August 14	September 11	October 9	November 13	December 11	January 8	February 12	March 12	April 2	April 14	April 22	May 14	June 3	June 11	July 9	July 29	August 13	September 10	September 23	October 8	November 12	December 10	December 17	December 31	Total Records
3	Carrion Crow				1																					2	2					5
5	Jackdaw																						1		1	2	1	1				6
7	Magpie				1	2	2	2		2	1	4			1		1		1		1	1	2	3	1	3		3		1	2	34
11	Jay			1	3	4	1	2		3	8	5	8	4	3	2	4	2	4	2	1	4	10	4	3	9	2	4	2	3	6	104
33	Bullfinch	1		3				8							1	2		1				1	1	4	1	2		5	5	1	4	40
41	Chaffinch	1	2	15	12	1	7	5		6		3		2	2	6	14	12	15	11	8	1	1	1	5		1	1		1		133
93	Tree-Creeper	1	1	1				2	2	1		3	2			2			1				1			1		4				22
96	Nuthatch						1		3	2	2	8	2				1	2							1							22
97/98	Great Tit	17	2	16	12	36	11	29	9	9	9	9	6	16	9	7	10	8	13	5	10	2	3	19	17	6	4	11		2	4	311
99/100	Blue Tit	41	12	15	7	12	16	49	30	11	27	40	16	19	15	18	10	15	13	6	1	17	18	32	30	11	13	19	5	6	11	535
102	Coal Tit	1	2				3		1	1		4	5		4	4		3	2			1							2			33
107	Marsh Tit	3	1	2	1	2		4	2	2	1		2	1		1	2	1	1	1		1	2	1	3	2	1	4		1	3	45
108	Willow Tit			1		5					2				1									1	1							11
107/8	Marsh or Willow Tit														1											1						2
111	Longtailed Tit	10	2	1		4		30	16	3	1	3	14	4	5	3	2			12	1		3	15	1	14	1	1		2	16	164
	Tits (unidentified)					4	10				41	85									8	30	50	6		30		7	4	4	4	283
126/7	Goldcrest	2								1	3		3															4		1	1	15
129	Chiffchaff			3	2	1	2	2								1	4	2	5	3	4	2										31
132	Willow-Warbler			14	14	11	5	2									4	13	18	14	10	4	21	4								134
161	Garden-Warbler				4	2													3	2												11
162	Blackcap				3	2	1												1	2	3	1	1									14
163	Whitethroat																		3													3
175	Songthrush			1													1											1	1		1	5
178	Redwing																														15	15
184	Blackbird		2	8	11	11	10	6		5	5	10	7	11	8	2	8	5	14	3	7	5	2	3	3	1	2	8	12	16	17	202
203	Nightingale				2																											2
208	Robin	12	16	21	23	10	14	13	3	19	8	12	6	13	20	29	30	22	31	16	16	9	7	14	18	22	14	15	8	12	5	458
211	Hedge-Sparrow		1												1		1	2							1	1						7

Table II (*continued*).

Handbook No.	Species	1949											1950																			Total Records
		January 9	March 13	April 10	May 8	June 12	July 10	August 14	September 11	October 9	November 13	December 11	January 8	February 12	March 12	April 2	April 14	April 22	May 14	June 3	June 11	July 9	July 29	August 13	September 10	September 23	October 8	November 12	December 10	December 17	December 31	
213	Wren	12	9	11	13	8	13	15	5	14	6	4	11	7	9	14	18	16	8	9	7	10	9	15	13	7	3	3	4	5		278
220	Swallow																									4						4
235	Green Woodpecker			1			1	1									1			1	1	2	1	3	1	3				1	1	18
237	Great Spotted W'pecker							1	1			1	1		1	2	3								1	1			1			13
240	Cuckoo					1											1			2	1											5
253	Tawny Owl											2	2	1	1	1															1	8
277	Sparrowhawk	1																				1						1				3
380	Wood Pigeon				1	5	1	2	1		6	68		5						1		1	3	4	4	10	3	4	26	2		147
393	Woodcock												1																1			2
517	Pheasant	1					1					1				2	2	1	2			1	1					1				13
	Other species recorded on one occasion only											1	1					1	1									1				5
	Unidentified						6	2		1	1		1				1					6		3	2	3	3	7	6		3	45
	Totals	103	50	114	110	121	105	175	73	80	121	263	88	83	82	96	118	106	136	90	79	100	137	132	107	135	50	105	77	58	91	3188
	Tits in Flocks	45						67	46		52	98	26									30	50	51	28	50					26	
	Tits not in Flocks	27	19	35	20	63	30	45	12	26	29	43	17	40	35	33	24	27	29	24	20	21	26	23	24	13	19	42	11	15	12	
	Total number of Tits	72	19	35	20	63	30	112	58	26	81	141	43	40	35	33	24	27	29	24	20	51	76	74	52	63	19	42	11	15	38	
	Total birds in Flocks	42						67	46		52	166	26									30	50	51	28	50			20		41	
	Total (without Flocks)	58	50	114	110	121	105	108	27	80	69	97	62	83	82	96	118	106	136	90	79	70	87	81	79	85	50	105	57	58	53	

N.B. This table only includes the full counts of the whole wood. There were a number of other counts (and maps of territories) for parts of the area.

markedly when nesting is in progress. The proportion of mated to unmated males is variable, and Lack suggests that up to 50% may be unmated.

2. *List of Species.*

Table II shows a list of the species present in Eastern Wood during the counts of 1949 and 1950. The dates given are only those on which a complete count of the whole wood was made. Other visits were made when only small sections of the wood were studied. Five species were recorded once on one occasion only and are not named separately. 41 species were identified. The classification of these is somewhat arbitrary but 16 might be described as residents, 5 as residents whose numbers are augmented by winter immigrants, 7 as summer visitors, 4 as winter visitors and the remaining 9 species as occasional visitors. The number of species present in the breeding season is thus probably 28. These figures are based upon observations in addition to those shown in Table II.

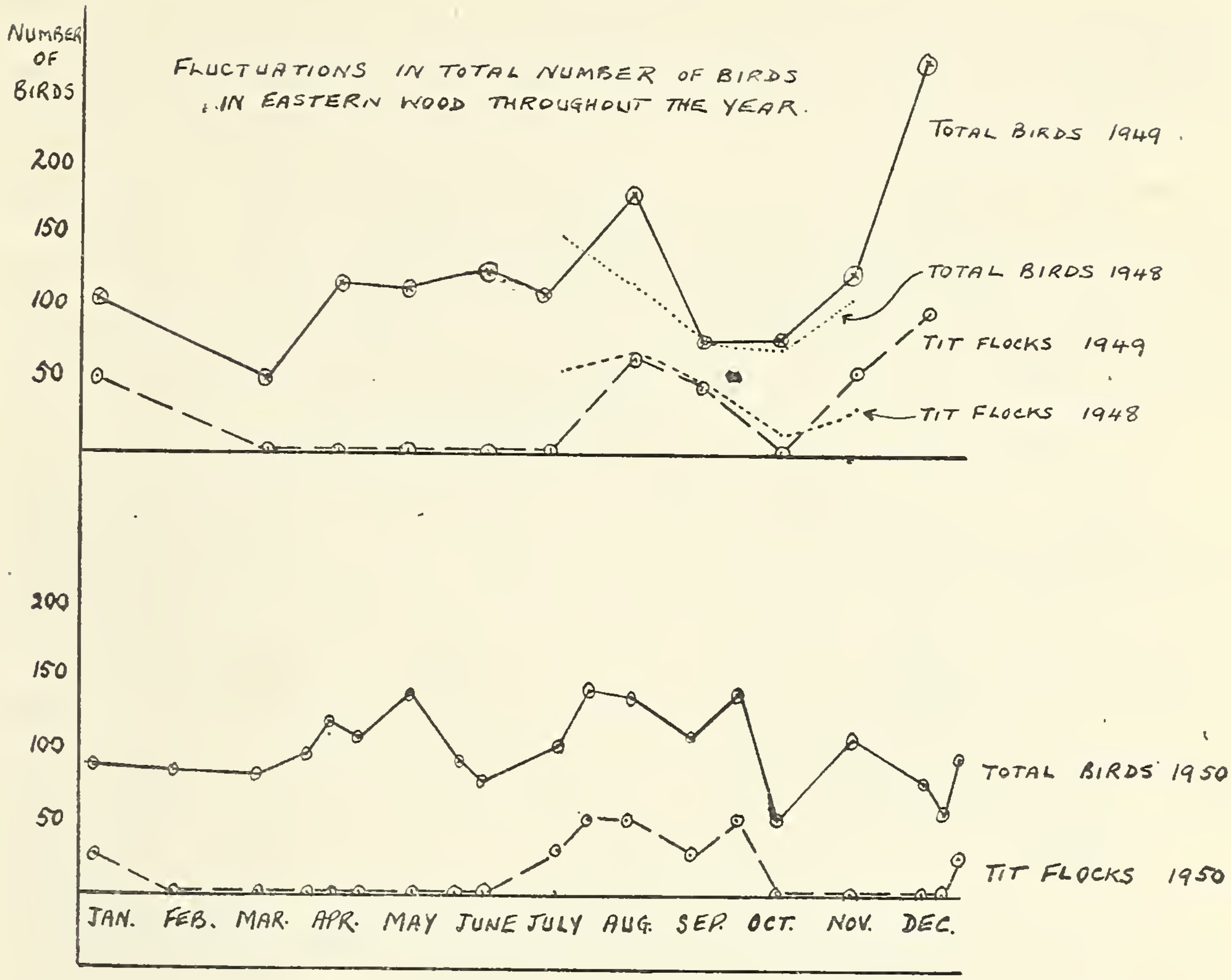
Elton (1935) points out that between 11 and 31 species may be taken to be the normal number of bird species to be expected in an English wood of 2-10 acres in size. Lack and Venables (1939) found about 35 species in oak woods during the breeding season, in their survey. Palmgren (1930) (quoted by Elton, 1935) found 38 species in scrub-woodland in Finland during the breeding season. Colquhoun (1940) lists 28 species, in his spring survey of a typical mixed wood of 11 acres on the Berkshire Downs.

When comparing the list of species in Eastern Wood with the notes on status in the woodland generally, by Carrington, Castell and Wilton (1944), a number of changes would appear to have occurred. The Magpie and Jay have apparently increased and possibly also the Tree Creeper and Willow Tit, although the latter may have been overlooked. The Goldcrest also appears to be more frequent, and a number of records suggest that it may be resident in the north-east part of the woodland (outside Eastern Wood). They found no record of the Song Thrush in the woods and this species still seems to be present only in small numbers.

3. *Total Number of Birds.*

In Figure 2 are shown the fluctuations in total numbers of birds within Eastern Wood throughout the years 1949, 1950, and the latter part of 1948. Below on the same graphs are shown the numbers of Tits present in flocks (that is parties of 10 or more) on the same counts. Marked fluctuations of bird population are shown. In any consideration of these results the following points must be remembered:—(1) The numbers involved are small, (2) the figures are probably minimum numbers, (3) it is probably too early for generalisations. However, there are several matters of interest suggested by the graphs:—

Figure 2.



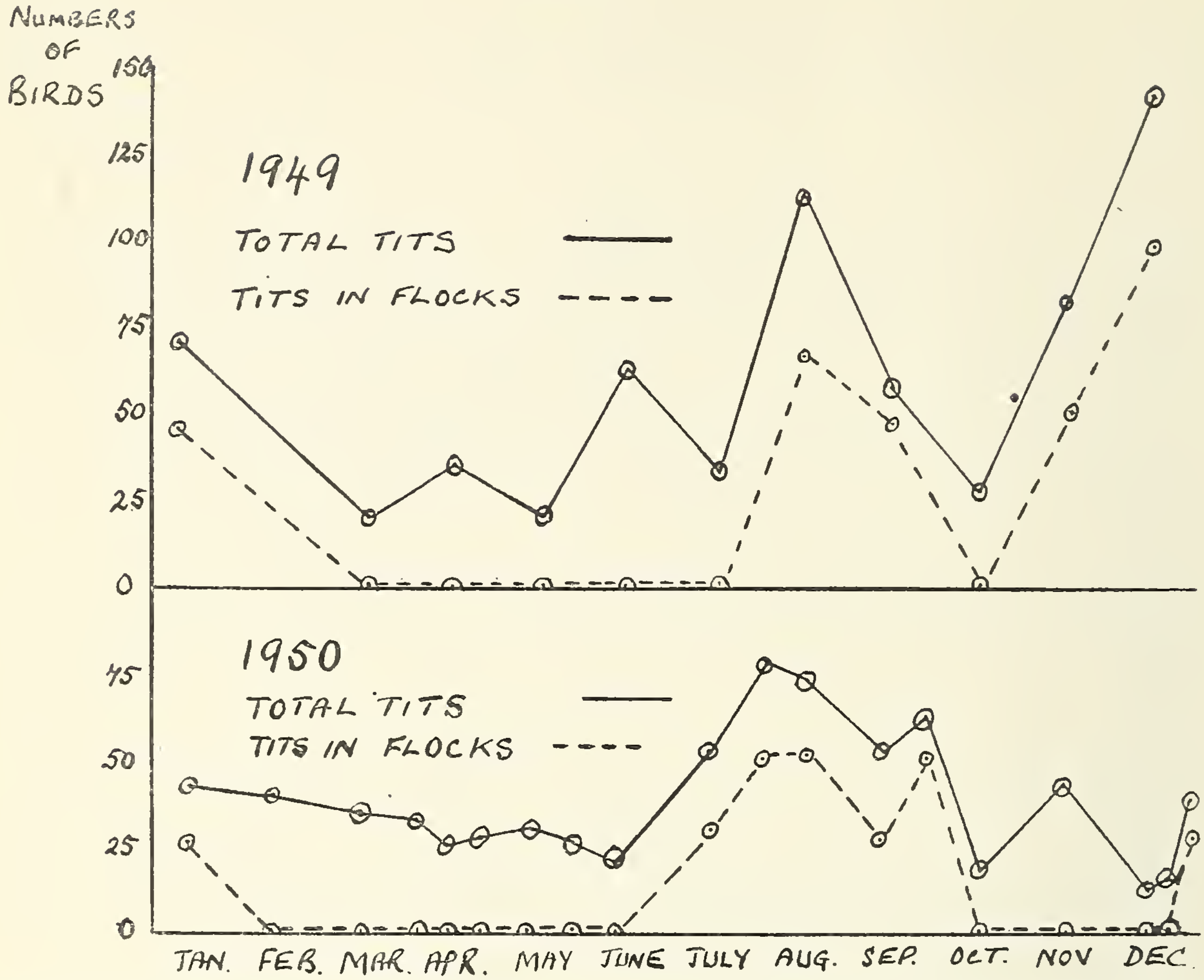
(i) The total bird population of Eastern Wood appears to increase in April and May. This may be real or apparent. There is an immigration of summer birds such as can be seen quite clearly in the figures for Willow Warbler (a summer migrant) and Chaffinch (a bird which would appear to winter largely away from the wood). The increase, therefore, is probably a real one, but on the other hand it must not be forgotten that birds increase greatly in conspicuousness at this time, largely due to the singing and conspicuous behaviour of the males.

(ii) During the April to June season, some idea can be obtained of the minimum population in the breeding season. The figure varied between 80 and 140 during this period in 1949 and 1950. These figures are certainly less than the true ones, as many birds will be incubating, and after the latter part of April there is more cover on the trees, and then the non-singing individuals become harder to discover. The population in the breeding season is thus probably greater rather than less than 130-140 birds or about 30-35 per 10 acres. Fisher (1940) gives a figure of 40 per 10 acres in deciduous woodland in Britain and a population of 38.4 to 53.0 birds per 10 acres was found in climax deciduous forest by Kendeigh (1944) in North America.

(iii) *Relationship to the Flocking of Tits.*

There appears to be a further increase in bird population in July, August and September, and this increase is largely due to the presence of flocks of Tits, which begin to form in July, and remain in flocks until after the following January. In Figure 3 the total numbers of Tits are

Figure 3.



THE FLUCTUATIONS IN THE NUMBERS OF TITS THROUGHOUT THE YEAR.

shown for the years 1949 and 1950, together with the numbers present in flocks. From this some indication of the population of Tits in the breeding season can be found, viz., from 20 to 35 birds, between March and May. In winter the total number of Tits rose to a maximum of 140. During the autumn and winter there were marked fluctuations in the numbers of birds of all species. As can be seen from Figure 2 these variations are largely due to differences in number and size of the Tit flocks. It may be significant that in October in each of the three years, the numbers of Tits in flocks have been very small or nil. In spite of this, however, it is felt that the fluctuation of bird numbers during these autumn and winter months is probably a matter of chance. The Tits from large areas of the woodland seem to band themselves into flocks of 20-40 strong, and wander about over larger areas than the sample surveyed. Thus when there were no Tit flocks in the area during the count, large flocks were sometimes noted just outside, and have even been seen to enter the area just after the count had been completed! The winter Tit population of Eastern Wood, when at its maximum, must contain birds originating from a larger area of woodland or possibly even areas outside the woodlands. From Figure 3 it is apparent that there are always some Tits present scattered about in the wood, not in flocks. The numbers of these seldom drops below about two-thirds of the number present in the breeding season and they are probably mainly the older resident birds. The flocks are likely to consist mainly of young birds. The proportions of the different species found in the wood both in flocks and singly are shown in Table IV. These ratios are compared with those found by Brown (1948) in flocks in pure oakwood in North Hampshire.

TABLE IV.

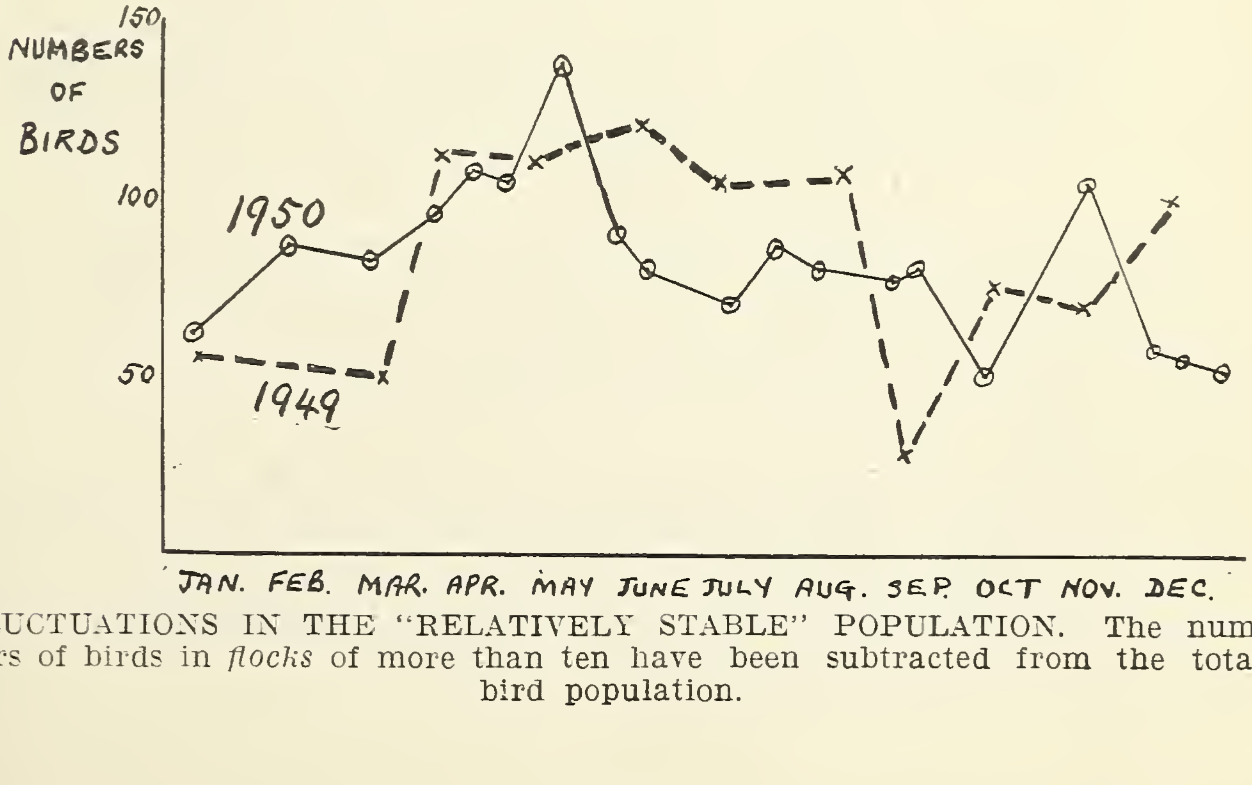
	Eastern Wood 1949 and 1950		For comparison
	No.s	App. Ratio	Pure Oakwood N. Hants (Brown) Ratio
Blue Tit	260	18	10
Great Tit	103	7	3
Lontailed Tit	82	6	13
Marsh Tit	24	2	7
Coal Tit	14	1	2
Willow Tit	4	< 1	0

The Proportions of the Different Species of Tits present in Eastern Wood during the winter months 1949 and 1950.

In this table the numbers of birds were obtained by adding together the results of all counts during the months of January, September, October, November and December in 1949 and 1950. (The birds were not all in flocks.)

As indicated above, the flocks of birds, largely but not only Tits (note immigration of Wood Pigeon flocks in December) probably wander over larger areas, entering this part of the wood from time to time. It is of interest, therefore, to turn to Figure 4 which is an attempt to show the fluctuation in the population apart from these immigrant flocks, throughout the year. The numbers of birds present in flocks of 10 or more is subtracted from the total number of birds present, and the result is plotted for the various months in 1949 and 1950.

Figure 4.

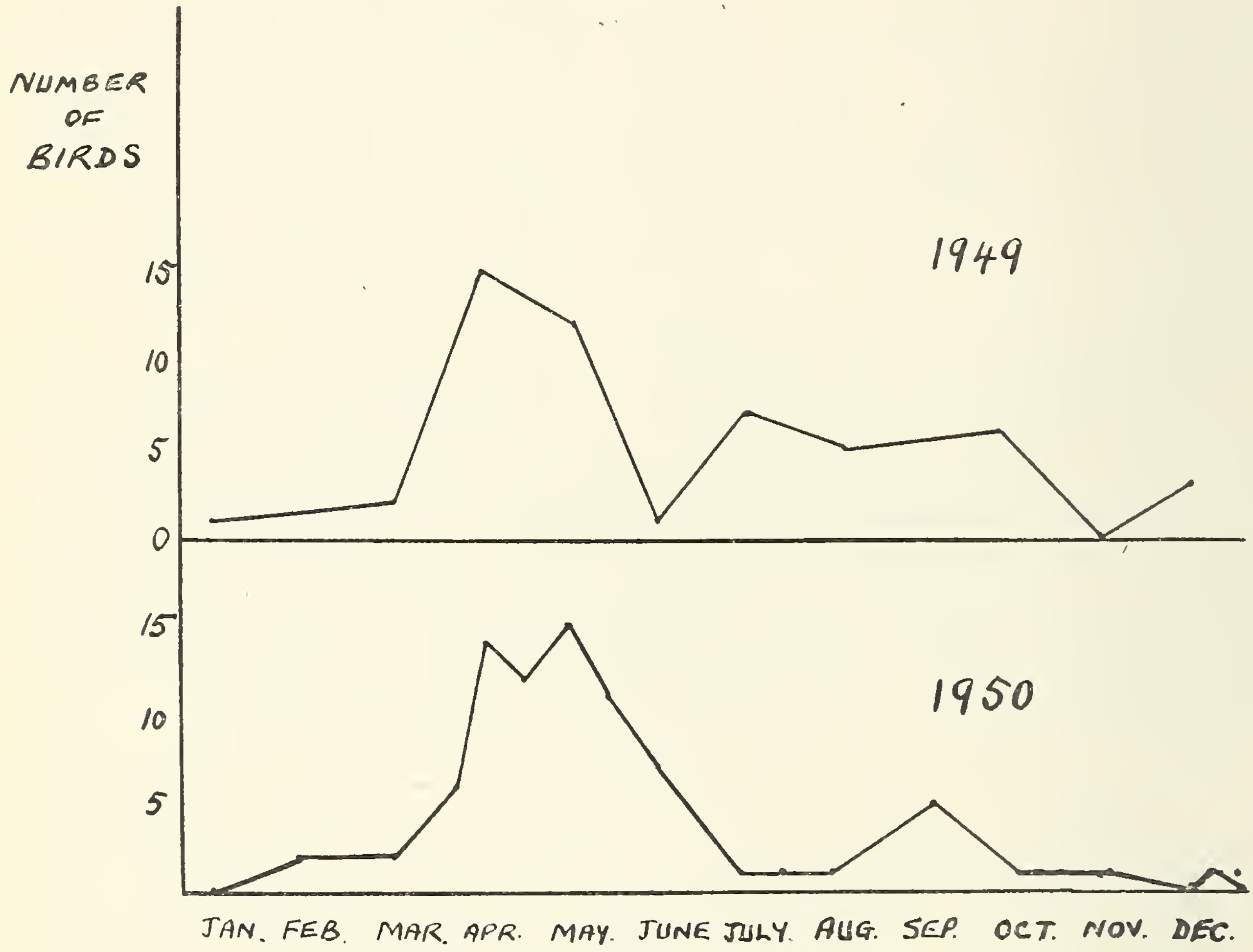


FLUCTUATIONS IN THE "RELATIVELY STABLE" POPULATION. The numbers of birds in *flocks* of more than ten have been subtracted from the total bird population.

The large fluctuations due to immigrant Tits or Wood Pigeons are thus removed, and some indication is given of the variation in numbers of the more "static" individuals. In both years an increase in the population occurred in the spring, with a decrease during the summer. The winter population, excluding the wandering flocks, would appear to be somewhere between 50 and 100 birds.

(iv) During June and July 1950 there appears to have been a decrease in the number of birds in the wood. This may only be an apparent decrease as at this time there is less song and less conspicuous behaviour and much more leafy cover, so that birds are harder to find. On the other hand the figures suggest that certain birds leave the wood at this time, for example Chaffinches (see Figure 5) and some warblers.

Figure 5.



TOTAL NUMBER OF CHAFFINCHES.

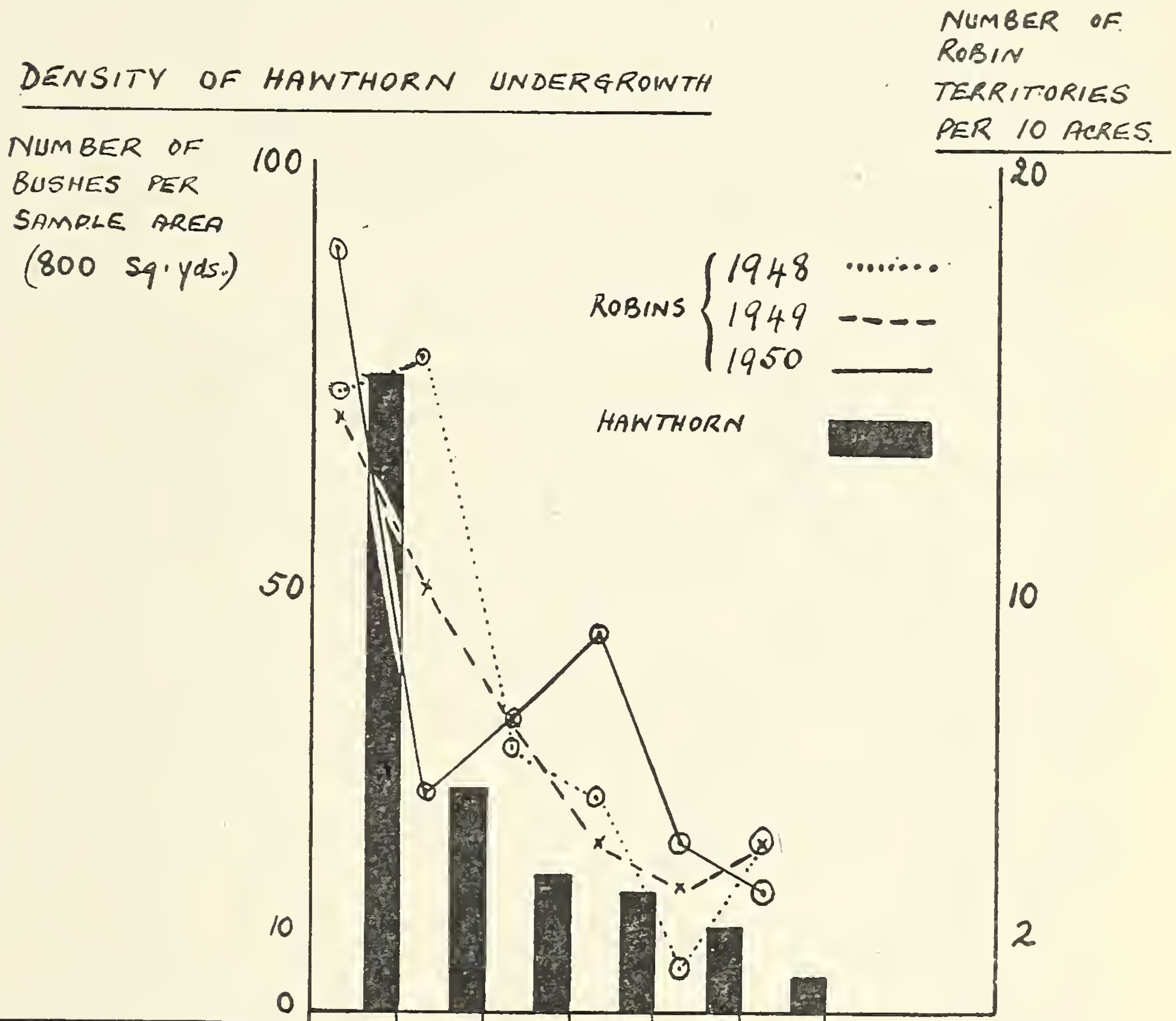
In 1949 this effect is not noticeable, but it may have been obscured by a number of family parties of Tits, which were more in evidence on June 12th, 1949, than on the corresponding date in 1950, and if the numbers of these are deducted from the 1949 totals, a similar drop in numbers occurs.

(v) *Chaffinches.* Figure 5 suggests that the number of Chaffinches remains low until April, and then rises to its maximum during April and May. In June-July there is a drop and the numbers seem to be at a minimum from October or November until the following spring. But the numbers involved are small.

4. *The Distribution of Birds compared with some variations in the Vegetation.*

A start has been made in the study of the density of territories in relation to the different types of vegetation, but few results have so far accrued. However, Figure 6 shows the density of Robin territories compared with the density of hawthorn undergrowth. The hawthorn bushes were counted in the sample areas as indicated in Table I. The positions of Robin territories were marked very approximately on a map, and this was superimposed on another map which showed the areas of the different types of tree and secondary growth, as represented by the samples (Figure 1). The areas are shaded differently,

Figure 6.

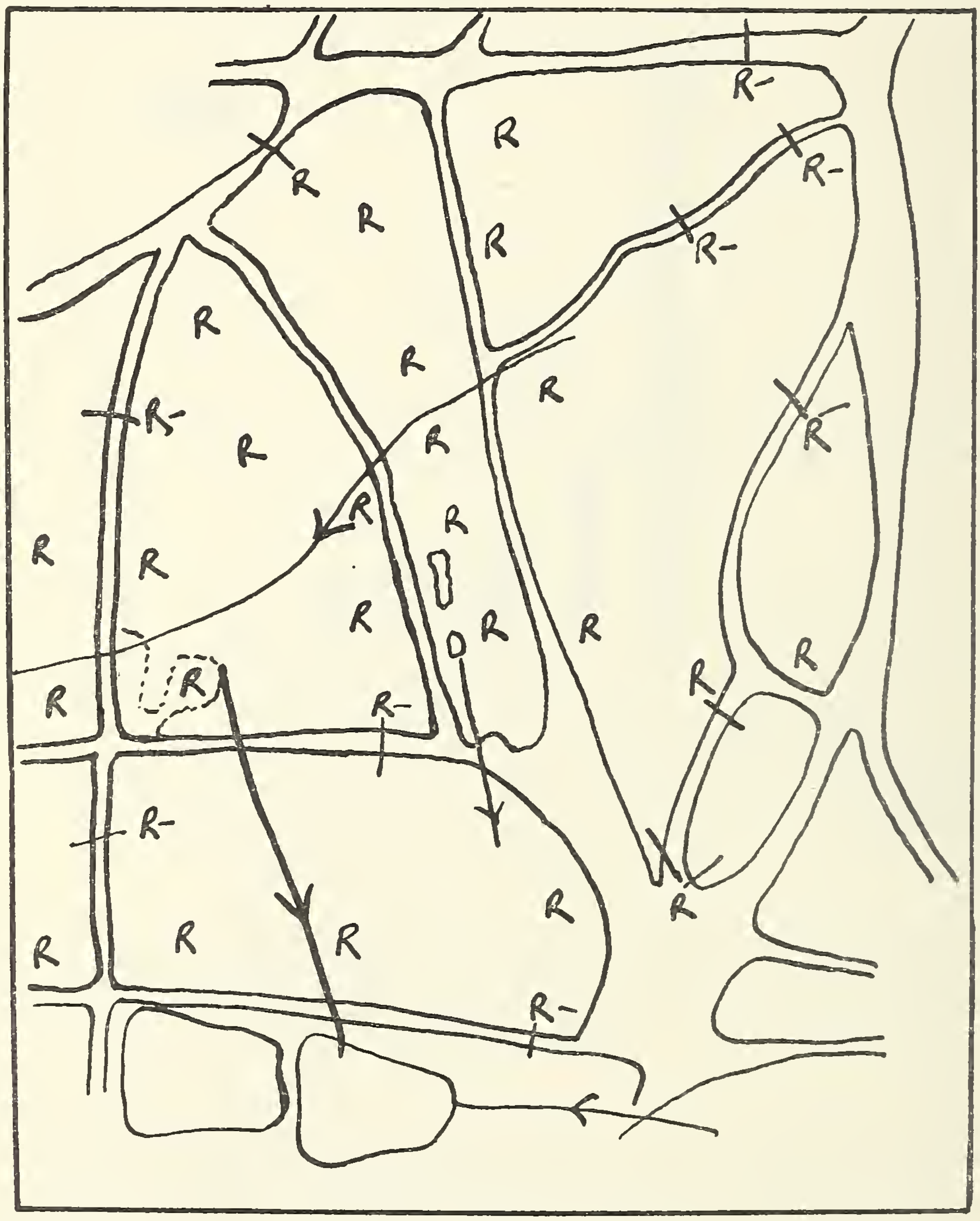


	AREA	III	VI	II	IV	I	V
ROBIN TERRITORIES per 10 acres	1948	14·2	15	6·3	5	1·4	4
	1949	14	10	6	3·3	3	4
	1950	18	5	7	9	4	3

THE DISTRIBUTION OF ROBINS IN RELATION TO THE HAWTHORN UNDERGROWTH.

and indicated with figures corresponding to the sample areas. Those territories which overlapped to any marked extent on to another area were counted as half a territory in each area. Then the territory density figure was calculated as the number per 10 acres. The figures are shown for the years 1948, 1949 and 1950. It will be seen that the density of territories is higher where there is denser hawthorn undergrowth. When this investigation was repeated using the Robin figures and the density of Hazel coppice, no such relationship was found. Again no definite relationship could be determined for the Wren or Willow Warbler territories and the hawthorn shrubbery in 1950. It seems, therefore, that the Robin territories may be much smaller in areas with dense hawthorn thickets and that the number of territories there may be as much as 3½ to 6 times that in areas with much more sparsely scat-

Figure 7.



DISTRIBUTION OF ROBIN TERRITORIES, 1950. R is placed in the estimated centre of the Robins territory. —R\ indicates that part of the territory is across the footpath.

tered bushes. Elton (1935) has drawn attention to the great importance of undergrowth in increasing bird density, and Colquhoun (1940) believes that the presence or absence of hawthorn scrub may sometimes be a deciding factor in the distribution of forest birds. There is much work however to be done in this field.

Summary. The main object of this paper is to show the lines along which the survey is proceeding. The following provisional conclusions may be offered:—

1. The density of trees and secondary growth showed considerable variation in a sample area of mixed damp oakwood of 40 acres.

2. There were territories of approximately 23-24 Robins, 16 or more Wrens, 19 Willow Warblers, 2 Chiffchaffs, 6 Blackbirds and 9 Chaffinches. These are average figures based on the results of several years, which show some variation.

3. All the birds except occasional visitors belonged to 32 species and there were 28 species present in the breeding season.

4. The total bird population appears to increase in April and May and decrease slightly in June and July, after which there is a further increase. The population then shows a marked fluctuation during the autumn and winter.

5. The population in the breeding season is probably at least 130-140 birds and during the winter (apart from visiting flocks) probably between 50 and 100 birds. The population of Tits in the breeding season is probably 20-35 or more.

6. The increase in the numbers of birds in the autumn and the fluctuations from then on are largely due to immigrant bands, mainly of Tits.

7. Chaffinches apparently largely leave the woodland in June-July and return in March-April.

8. Robin territories were most densely packed together (18 per 10 acres) where the hawthorn secondary growth was thickest (more than 50 bushes per 800 square yards) and became progressively less dense as the hawthorn thinned out until a minimum was reached of 1.4 per 10 acres in rather open areas of woodland (with 5-10 bushes per 800 square yards).

The need for further work is apparent. The population figures should be extended over a much longer period, to have real significance. There is ample scope for more investigation in density of territories in relation to the vegetation. The relation of numbers of certain species at different seasons with other areas of the Common or the surrounding country needs research. It should perhaps be stressed that the results mentioned above do not necessarily refer to areas outside the small sample of Bookham oakwood studied. The English names used for birds in this paper are those used by the *Handbook of British Birds* (Witherby, 1941).

ACKNOWLEDGMENTS.

As has already been pointed out, this survey is being carried out by members of the Ecological Section and thanks are due to many members who have helped in making the counts. P. W. E. Currie has organised the survey over a large part of the time, and Miss E. M. Hillman and S. H. Chalke have assisted with the tables and maps, as well as making several extra counts. C. P. Castell has given valuable advice on the description of the vegetation. In addition the following members have assisted with the counts:—L. Baker, Miss E. A. Bennett, Miss M. Bennett, J. F. Burton, Miss J. Collins, Miss J. Warlington, L. R. Evans, D. V. Freshwater, T. Gascoigne, Miss G. A. Haines, R. J. Harrison, H. O. Jones, Miss M. E. Kennedy, D. F. Owen, D. C. Pegram, B. A. Richards, Miss R. C. Sedergreen, Miss J. Sheppard, S. H. Singleton, Dr. A. G. G. Thompson, P. F. Yeo. Thanks are also due to a number of other members, who assisted with at least one count.

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City Bombed Sites Survey.

Progress Report.

THERE has been a very marked falling off in the interest shown in the survey of the Cripplegate area during the past year. One reason for this is, no doubt, that the black redstart is no longer such an attraction for ornithologists. Another reason may have been the inability of the organisers to provide sufficiently interesting work for members to do. This in turn was due to the fact that the time of the organisers at each advertised meeting was almost entirely occupied in showing newcomers round the site and in demonstrating the black redstart. They were thus largely prevented from doing any useful work on these days, while the majority of visitors, having seen the black redstart, do not come again. The organisation of meetings has therefore been changed. In future there will be only one advertised meeting in each half-year, at which newcomers will be shown round and an endeavour will be made to suggest useful lines of study. This will leave the organisers and others free to visit the area in their own time with some hope of being able to get on with the job.

It is not, however, the wish of the organisers to deter members from taking part in the survey. On the contrary, they would welcome assistance from any member who can spare a few hours to visit the area occasionally, especially botanists, entomologists and members willing to study the mollusca or the woodlice, centipedes, spiders or other arthropods. Botanists should communicate with Mr. F. E. Wrighton, whose paper on the plant habitats follows this note; others are asked to get in touch with Mr. P. W. E. Currie.

Plant Ecology at Cripplegate, 1950.

By F. E. Wrighton.

Further consideration of the main bombed site habitats has not revealed any great fault in the account of them given in an earlier report (Wrighton, F. E., 1948. Plant Ecology at Cripplegate, 1947, *London Naturalist*, No. 27, pp. 44-48). It is felt, however, that the subject could be rendered more clear by the use of pictorial illustrations, and to this end, the writer has prepared a series of drawings to accompany this article. In addition the survey has been fortunate in enlisting the services of Mr. K. H. Le Sueur, to whom we are indebted for the photographic illustrations. The following notes and pictures are therefore intended to supplement the descriptions given in the above-mentioned report.

General. (Fig. 1 & Plate I). A cross-section of some typical basements is shown in Fig. 1, and on it some habitats are indicated. On the left can be seen part of a disused building, of which a few remain in the

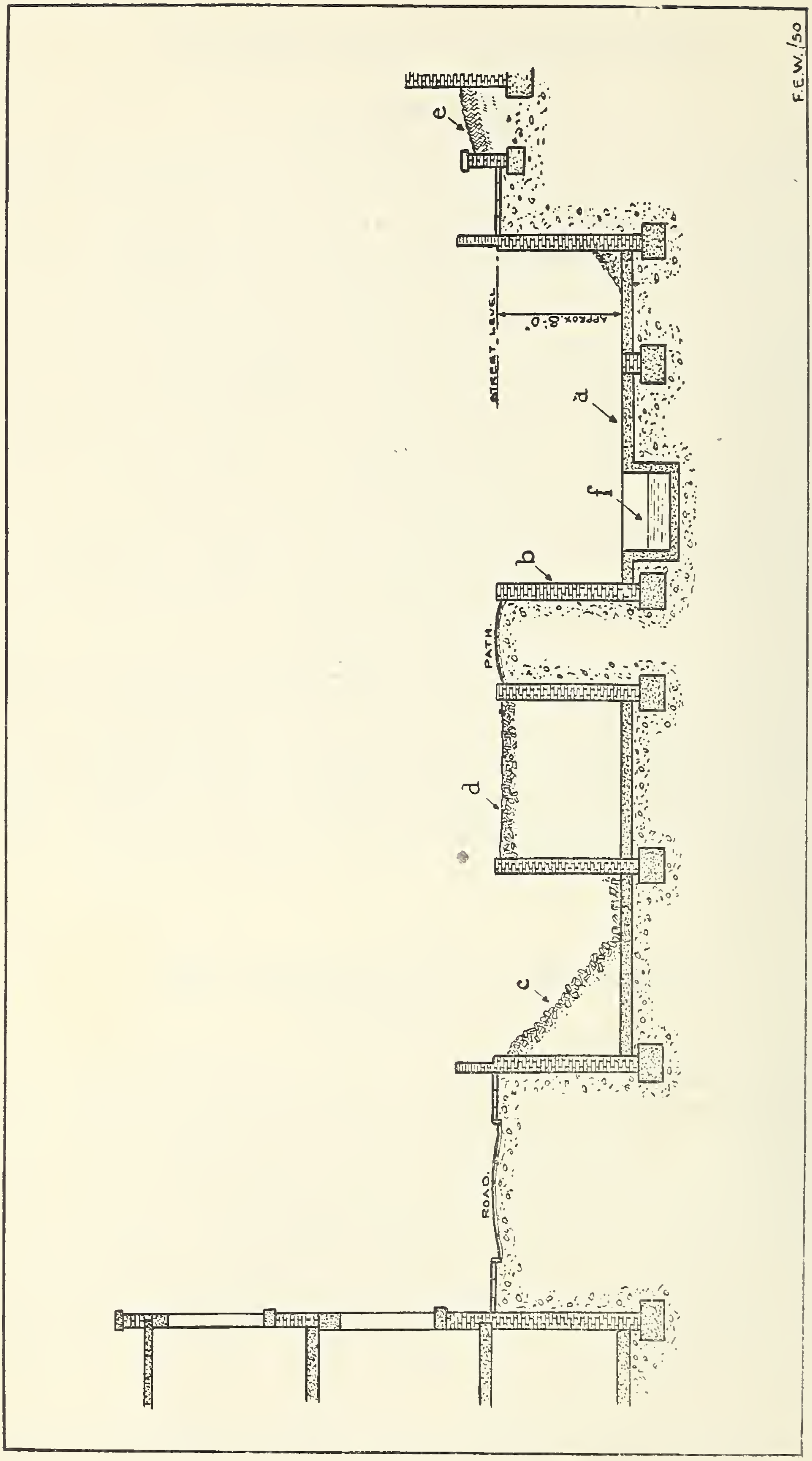


Fig. 1. Typical bombed site habitats: (a) basement floor; (b) wall; (c) rubble bank; (d) hard rubble; (e) garden; (f) water.

survey area. They are often unsafe and difficult of access, and are of interest mainly as haunts of the Black Redstart. In one case, however, ascent is easy, and the roof vegetation, some 40 feet above the ground, has been inspected. Very little soil was present, but small plants of *Epilobium angustifolium* L., *Senecio squalidus* L. and *Poa annua* L. were to be seen, rooted in the accumulated dust. On other tall buildings adjoining the area, a profuse wall-top growth consisting largely of *Senecio squalidus* L. has been noted, but a close inspection has not been possible. It will be apparent that the colonizing seeds were either wind-borne or carried by birds.

Basement Floors. (Fig. 2 & Plate I). The main features are still (a) larger plants rooted in cracks and (b) soil formation due to the colonization of dust by mosses and small plants. With reference to the latter, *Bryum argenteum* L. has been an outstanding species for several years, and very fine carpets of it have been seen. Perhaps as a result of the drought of the preceding summer, there was a widespread dying-off of the species during the winter 1949-50, which transformed the thick green carpets into patches of wet litter. The *Bryum* still survived as small and scattered plants, but had regained none of its former luxuriance by the end of 1950. There was a similar dying-off of the liverwort *Marchantia polymorpha* L., which had previously shown a similar vigour in its own habitat, beneath shading *Senecio* on rubble banks.

Walls. (Fig. 3). As shown in the figure, debris on a wall-top often supports vegetation. Roots enter the cracks, and disintegration of the structure is accelerated. Seedlings often become established on a wall face; but usually their development is limited by lack of root space and by an inadequate water supply.

Rubble. (Figs. 4, 5, & 6 & Plate II). By far the greater part of bombed-site vegetation is supported on rubble, and this forms several distinct kinds of habitats. For the present purpose three main types have been chosen:—(a) coarse rubble, (b) fine rubble, and (c) hard rubble. Fig. 4 shows a bank of coarse rubble consisting of blocks of concrete, stone, and brick, with very little fine dust between. The spores of bracken germinate readily in the recesses of such a bank, usually 6 to 10 inches below the surface, among dust and the webs of spiders. Once established the underground parts spread rapidly, and the plant eventually becomes a local dominant. On fine rubble, or in cases where coarse debris is mixed with fine dust, the deeper recesses are absent and conditions are more suitable for seed plants. A bank of such material is shown in Fig. 5, which illustrates a form of zonation that can be seen in places, but which is by no means general. The example shows an upper zone rendered barren by water erosion and summer drought, and below this, in a position of extreme summer dryness, is a belt of *Chenopodium album* L., drawing moisture, by means of its extended root systems, from about 12 inches below the surface. The plants are small—about 15 inches—but seeds are ripened. The next, and main zone consists of *Senecio squalidus* L. which modifies the habitat by casting a shade and conserving moisture: conditions which enable several other

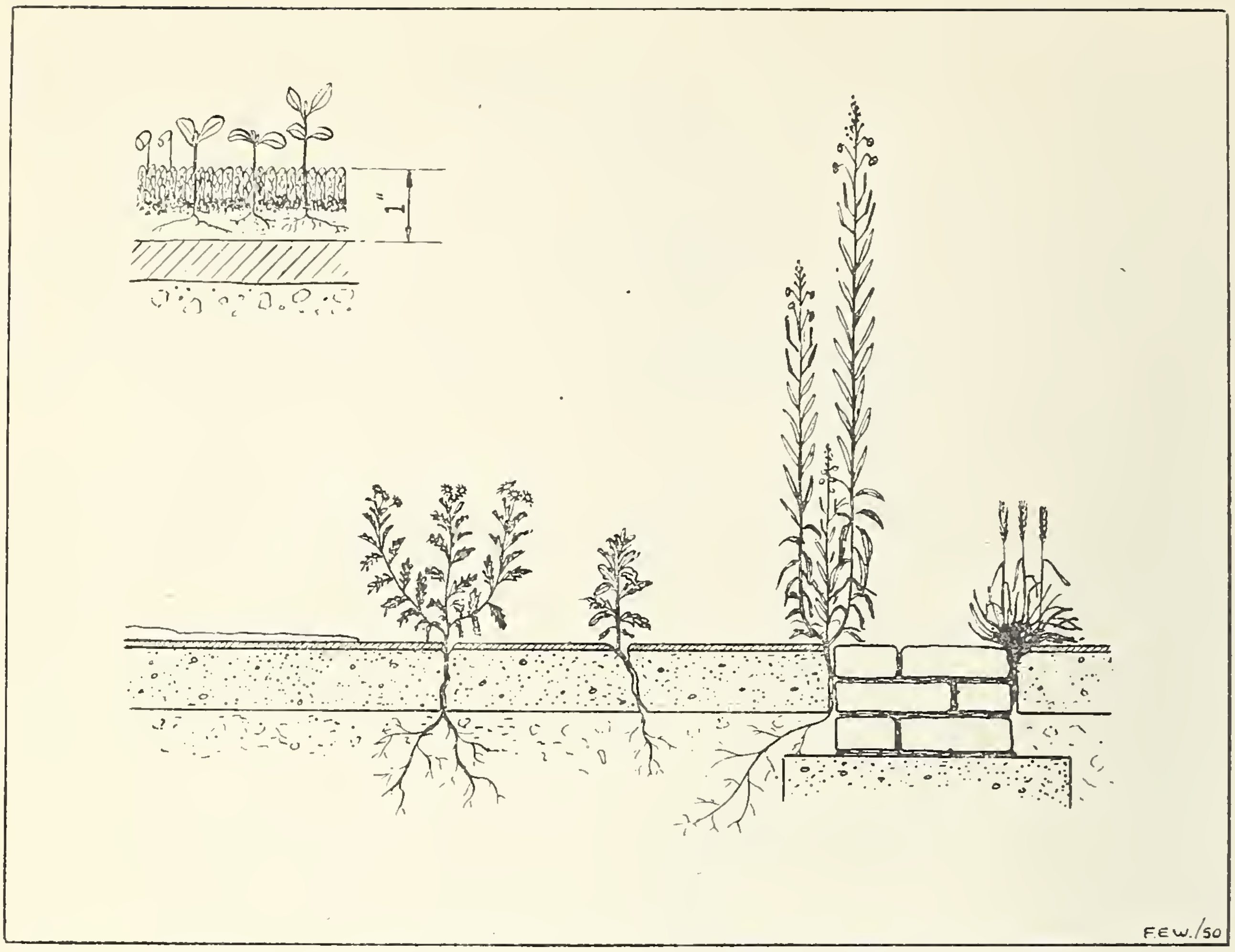


Fig. 2. Colonization of basement floor showing plants rooted in cracks. Inset—Seedlings of *Senecio squalidus* L. growing in *Bryum argenteum* L. over asphalt.

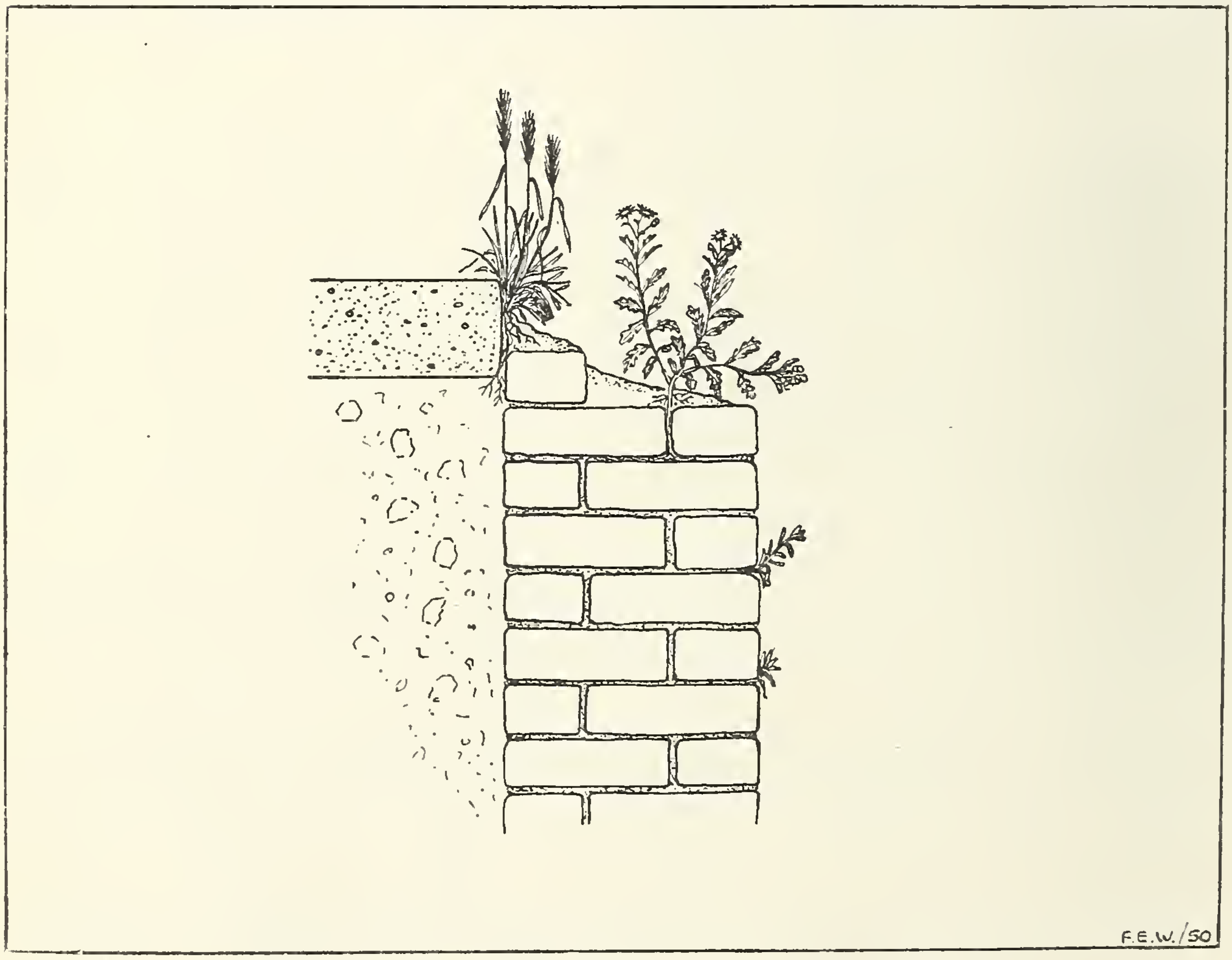
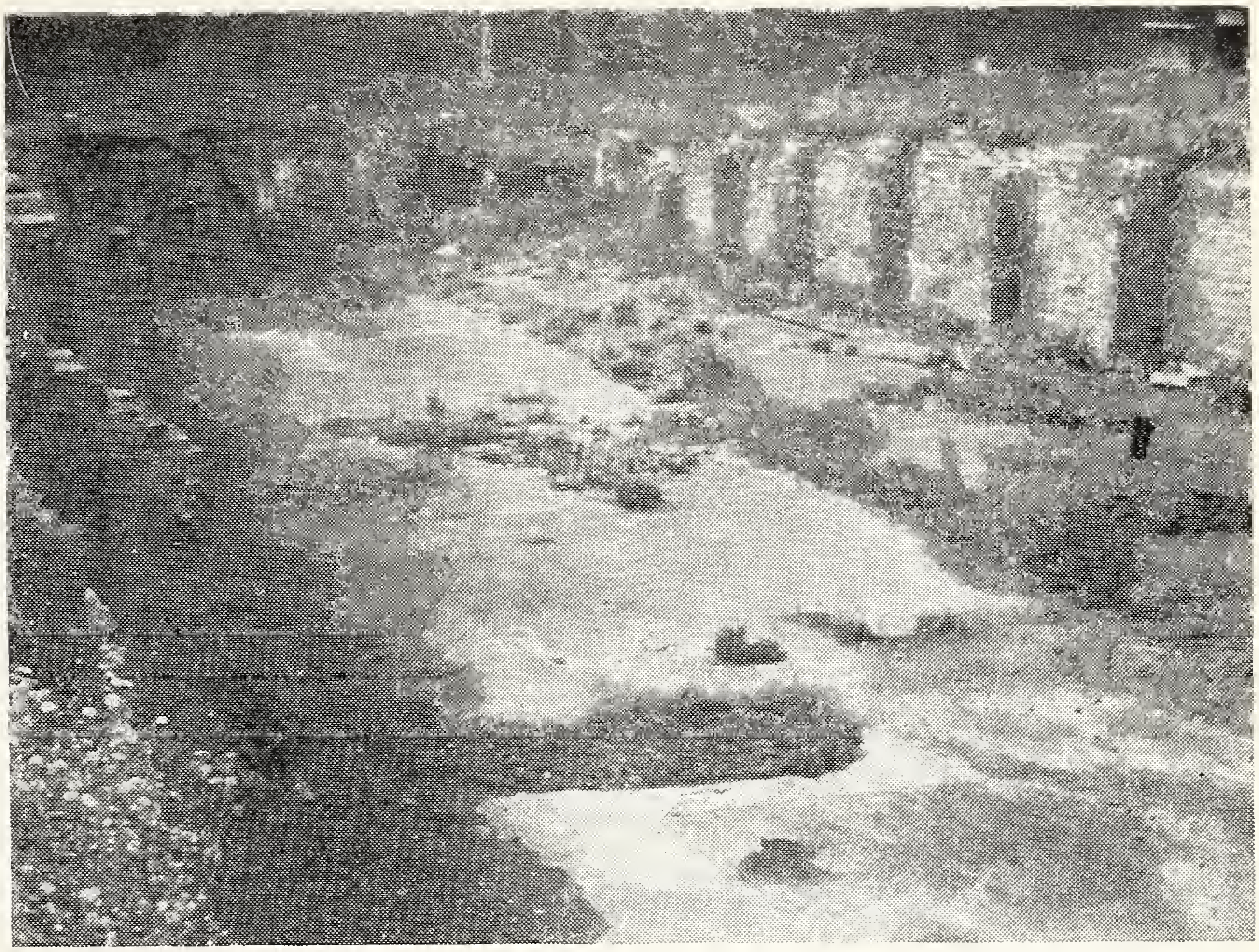


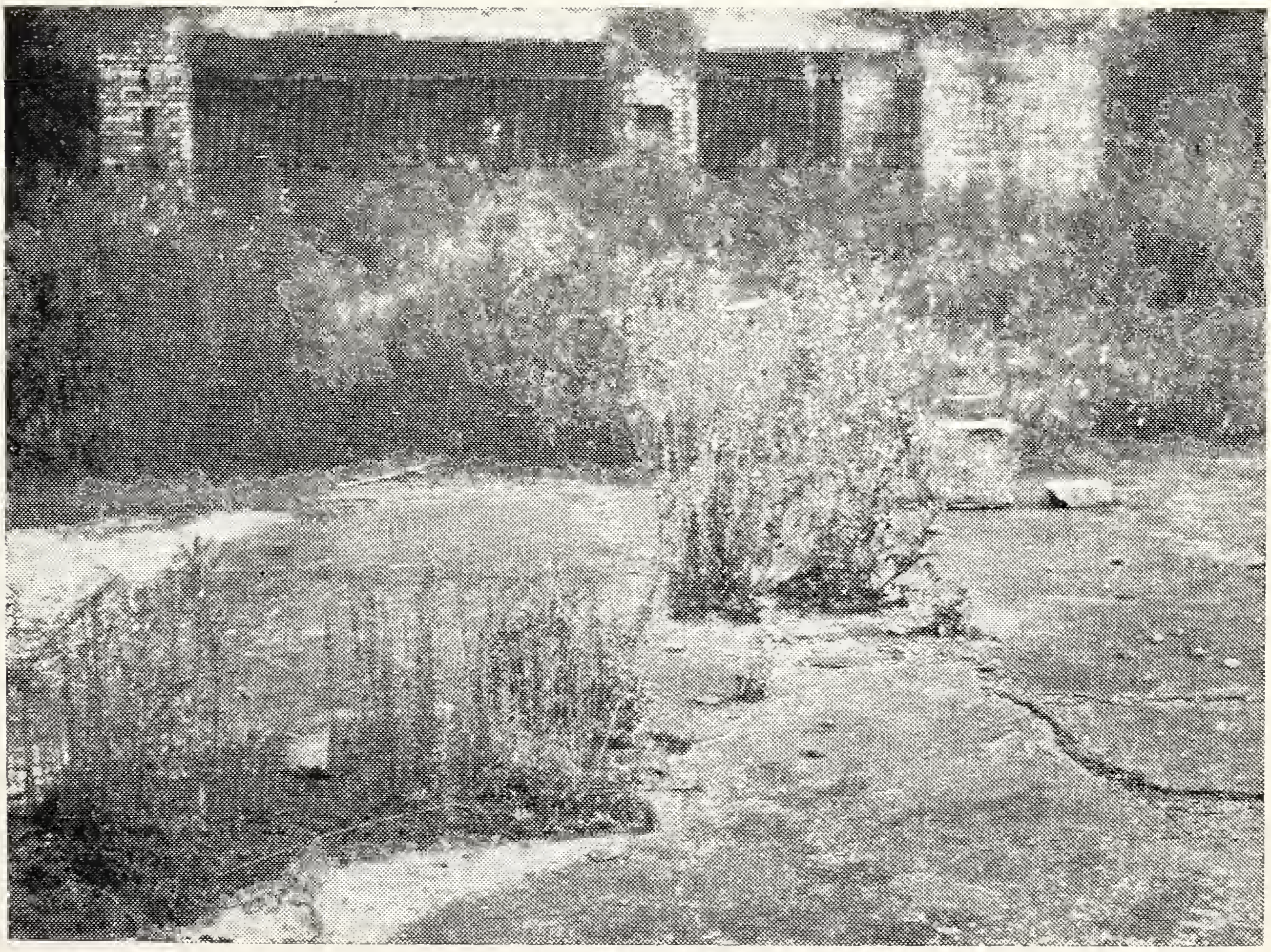
Fig. 3. Plants and seedlings growing on wall.

PLATE I.



K. H. Le Sueur.

General view of basement.



K. H. Le Sueur.

Plants growing on a basement floor.

PLATE II.

Pteris aquilina L. on coarse rubble.

BRITISH MUSEUM NATURAL HISTORY

Tussilago farfara L., etc., growing on rubble.

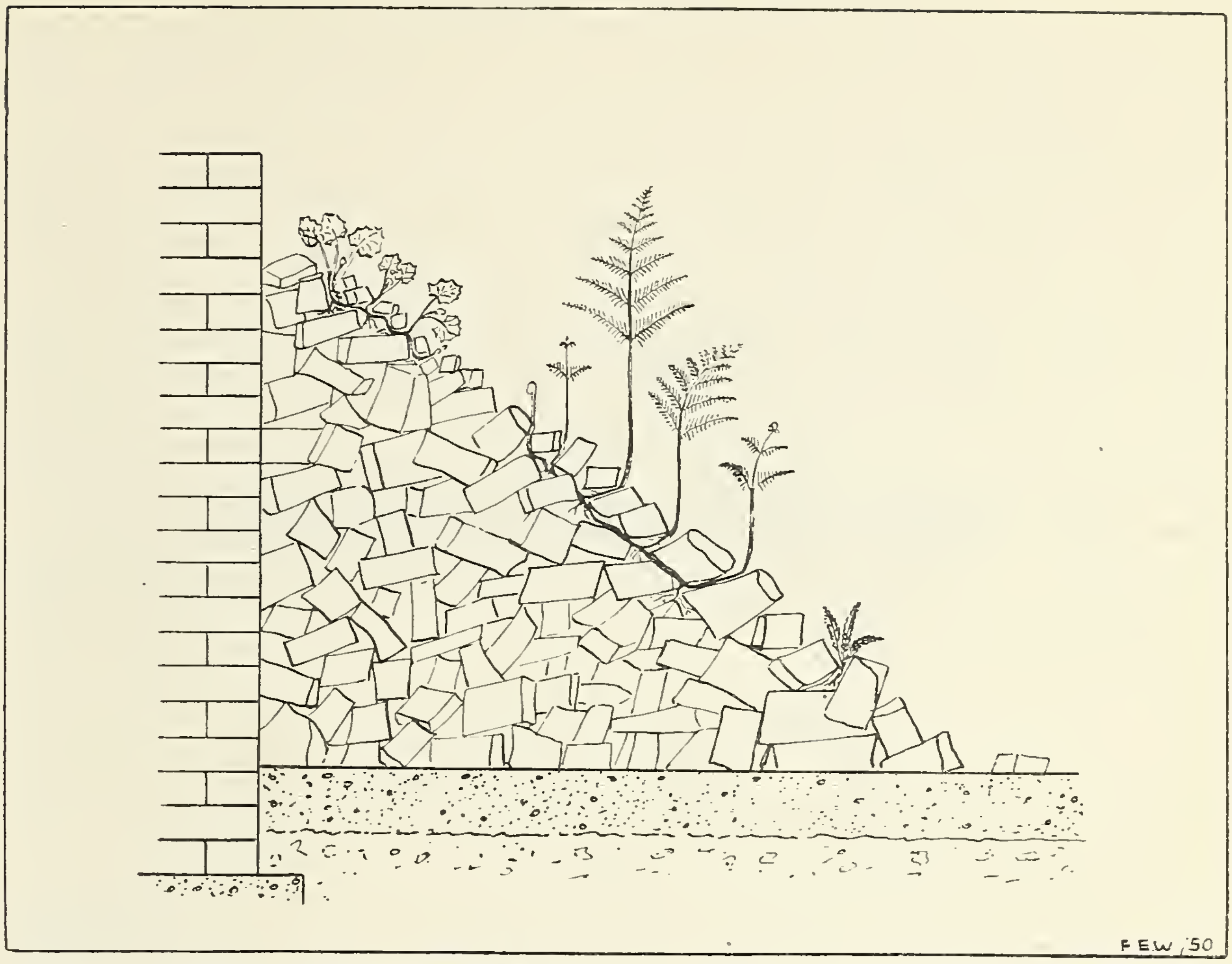


Fig. 4. Coarse rubble supporting *Pteris aquilina* L. and *Tussilago farfara* L.

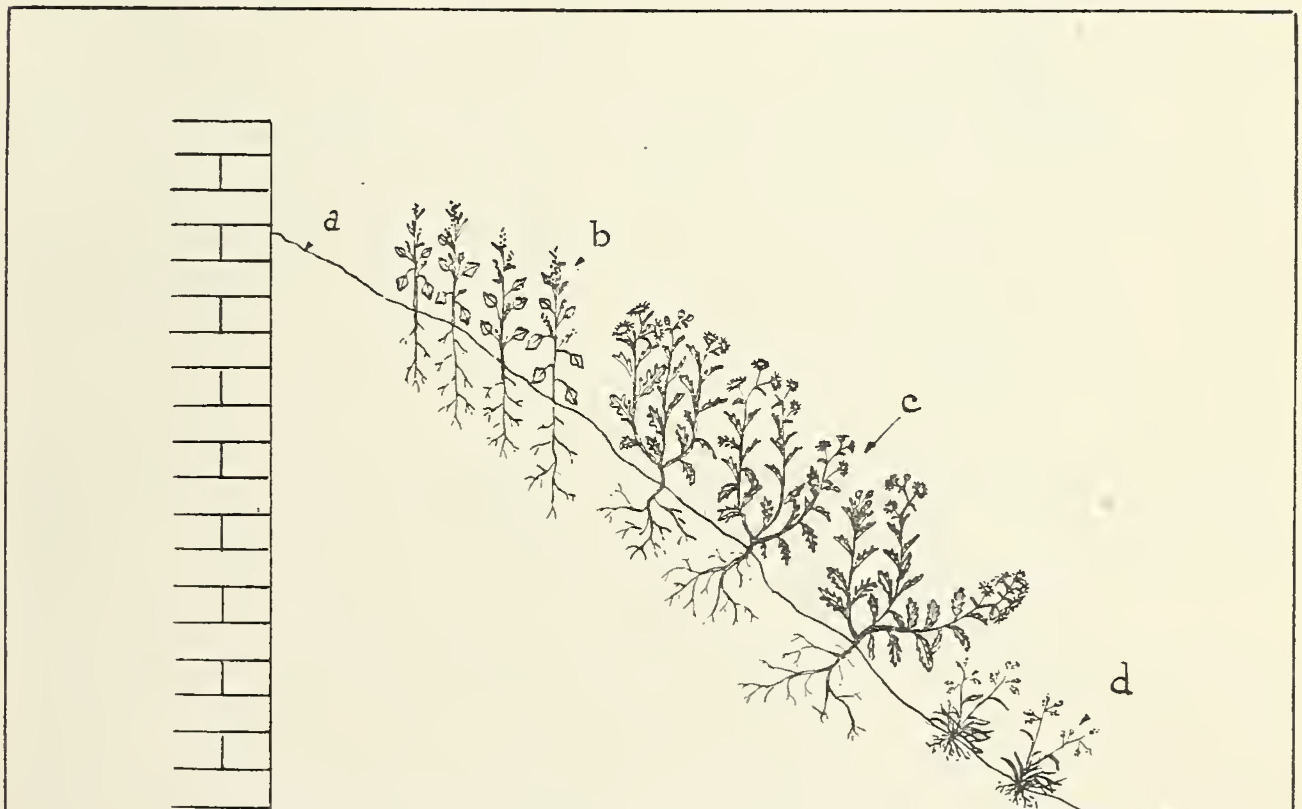


Fig. 5. Zonation on fine rubble: (a) bare soil; (b) *Chenopodium album* L.; (c) *Senecio squalidus* L.; (d) *Poa annua* L.

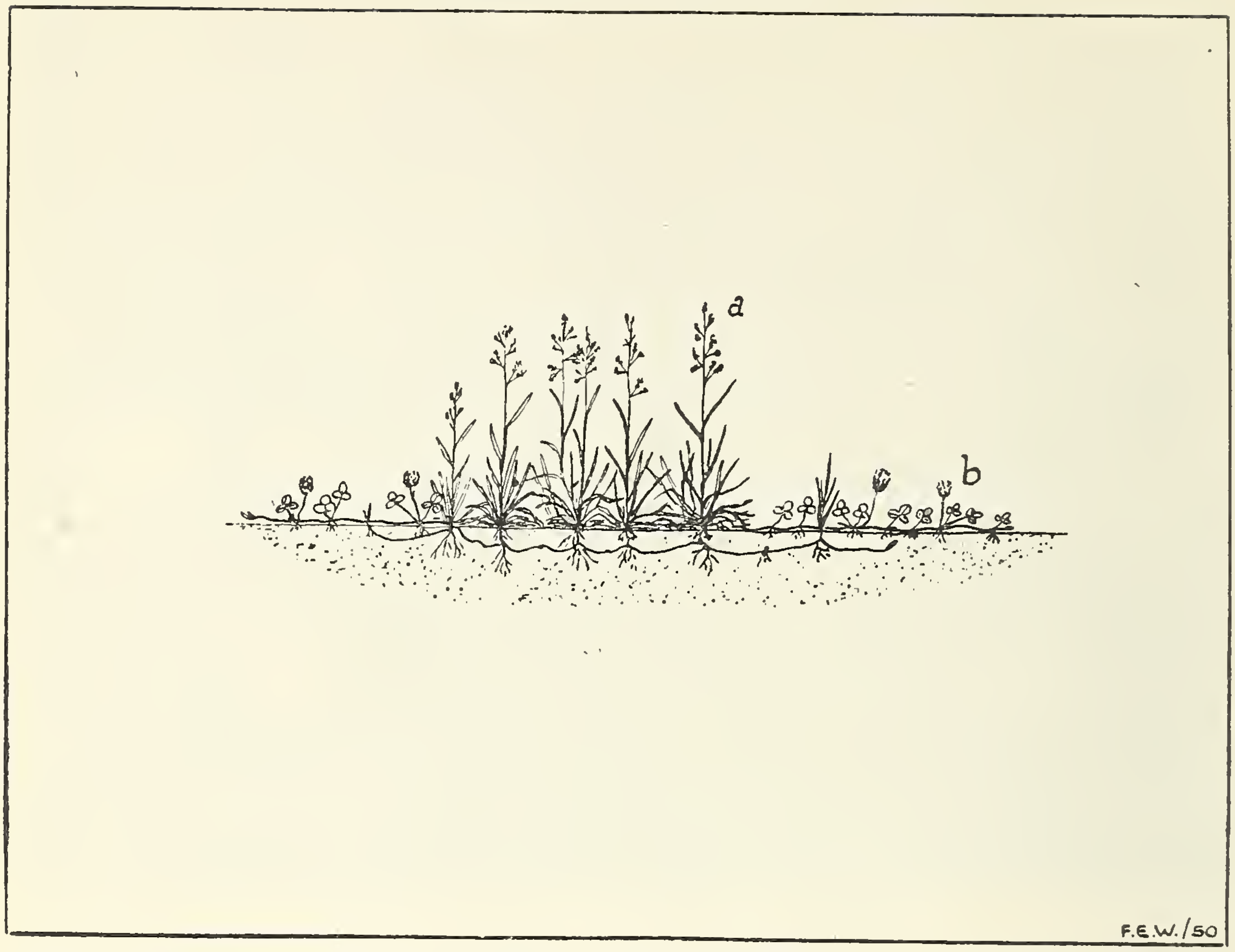


Fig. 6. Competition on hard rubble: (a) *Poa pratensis* L.; (b) *Trifolium repens* L.

plants, including *Marchantia polymorpha* L., to become established underneath. At the bottom of the slope are scattered plants of *Poa annua* L. produced from seed which has blown along the basement floor.

In many places fine rubble entirely fills a basement and a reasonably flat surface is formed at street level. On several such areas, large colonies of *Artemisia vulgaris* L. have become established, and are locally dominant. On others grasses are gradually forming a complete cover, which is excluding earlier colonists such as *Senecio*, *Chenopodium*, or *Sonchus*. Two other vigorous species, at present showing local dominance on loose rubble are *Cirsium arvense* Scop. and *Tussilago farfara* L. (Plate II).

Hard rubble includes ramps and level places consolidated by traffic, and this again shows a great diversity of plant communities. Colonization of such areas is often rather slow, which may be owing to a number of causes. For instance, light or plumed seeds are often unable to remain on the relatively smooth surface, and so find a resting-place elsewhere; while exposure, and the hardness of the soil, render conditions difficult for those that do remain. In addition, many of the less hardy species are retarded by treading, when they occur in places used by children at play, or on paths. The plants best suited to these conditions are mosses such as *Barbula unguiculata* Hedw. and *Bryum argenteum* L., and such small, hardy herbs as *Poa annua* L., *Cerastium vulgatum* L., *Trifolium repens* L. and *Sagina procumbens* L. Larger types of plants are often absent, but stunted specimens of *Senecio squalidus* L. are always present. Fig. 6 illustrates an example of competition which has been observed on hard rubble. A plant of *Poa pratensis* L. became established in the middle of a large patch of *Trifolium repens* L., and by means of its underground stems gradually spread outwards. The new shoots from these stems thrust upwards through the clover and dominated it by their greater height. In the course of one year the area of *Poa* increased from about 2 square feet to about 8.

GARDENS. No special study has been made of previously cultivated plots, as they are not, essentially, features of bombed sites. They have, of course, provided centres of growth from which certain plants have spread, but the writer is unable to give any reliable information on the subject, as he was not familiar with the original flora of the gardens.

WATER. Although small pools of water are present throughout the year, there is little to report of aquatic flowering plants. Algae and Protozoa are present, but no reports are yet available.

The Climate, 1950.

By H. HAWKINS.

(Observed at 119 Beresford Road, Chingford.)

BAROMETER.

Maximum for the year	30.60 on Jan. 12th & 18th and Mar. 5th/6th.
Minimum for the year	28.85 on Nov. 21st.
Average for the year	29.89.

TEMPERATURE.

	SCREEN.		GRASS (Night min.).
Maximum for the year	90	on June 7th.	63 on July 19th.
Minimum for the year	19	on Jan. 26th.	17 on Jan. 26th & Dec. 6th.
Average Maximum	57.03		
Average Minimum	43.23		
Average for the year	50.13		40.18
Average range	13.80		
Maximum range	71		

GENERAL NOTES.

THERMOMETERS are all tested by the National Physical Laboratories, and are housed in a regulation Stevenson Screen, with the exception of the Ground Thermometer which is exposed on grass during the night. Rainfall is measured in inches—1 inch of rain is equivalent to 4.7 gallons per square yard, or 101 tons of water per acre.

Last year's weather was in striking contrast to that of 1949, when we had one of the finest summers for many years. This year, the only warm and sunny month was June. Unsettled, rainy weather followed in July, August, and September, spoiling the holiday season in most areas, and having a disastrous effect on the harvest. For the year as a whole, the rainfall in Chingford was slightly below average (24.22 inches as against the average of 24.88 inches), but in many areas, particularly in the West and North, the rainfall was much in excess. The smallest rainfall totals occurred in Essex, north Kent and east Suffolk. The London Area surprisingly enough had more than the average amount of sunshine.

Month.	BAROMETER.			TEMPERATURE.										RAIN.					
											GRASS. NIGHT MIN.								
	Max.	Min.	Avge.	Max.	Min.	Avge. Max.	Avge. Min.	Avge.	Avge. Daily Range.	Max. Range.	Max.	Min.	Avge.	Amt. in Inches.	No. of Rain Days.	No. of Wet Days.	GALES.	THUNDER.	FOG OR MIST.
Jan.	30.60	29.70	30.21	52	19	43.09	35.55	39.32	7.54	33	50	17	33.19	1.21	13	4	0	0	1
Feb.	30.35	29.05	29.79	61	24	48.75	36.96	42.85	11.79	37	49	22	35.00	3.69	20	18	8	0	1
Mar.	30.60	29.45	30.11	63	21	53.80	38.48	46.14	15.32	42	51	19	35.93	0.68	11	7	1	1	3
Apr.	30.15	29.30	29.78	66	29	54.66	38.76	46.71	15.90	37	45	27	36.00	1.73	18	15	5	2	0
May	30.20	29.60	30.01	75	37	63.61	45.06	54.32	18.55	38	50	32	42.39	1.55	12	10	0	2	0
June	30.15	29.40	29.90	90	44	74.33	53.00	63.66	21.33	46	62	40	49.63	1.31	10	6	0	4	1
July	30.10	29.50	29.84	86	48	70.86	54.71	62.78	16.15	38	63	43	51.93	3.39	15	12	0	2	1
Aug.	30.05	29.40	29.77	81	47	70.74	53.55	62.14	17.19	34	61	43	49.77	2.05	19	13	0	3	0
Sept.	30.15	29.40	29.78	72	40	62.43	50.13	56.28	12.30	32	60	37	47.40	2.31	22	16	4	2	0
Oct.	30.40	29.40	30.01	72	29	56.68	43.58	50.13	13.10	43	50	23	38.64	0.30	6	4	2	0	1
Nov.	30.30	28.85	29.72	56	27	47.43	38.33	42.88	9.10	29	50	23	34.73	4.39	20	15	2	1	2
Dec.	30.15	29.35	29.80	51	22	38.03	30.64	34.32	7.39	29	42	17	27.51	1.61	17	12	1	0	2
														24.22	183	131	23	17	12

MONTHLY NOTES.

January.	Although the lowest temperature of the year was recorded on 26th, the first half of the month was remarkably mild, with maximum temperatures above 50 degrees.
February.	Another warm month—a maximum temperature of 61 degrees was reached on 17th. Rainfall was much above average, and was universally so in Great Britain. Gales were quite frequent.
March.	There were very few days during which the average temperature was not above normal. A maximum temperature of 63 degrees was reached. Rainfall was below average, and it could be called a dry month.
April.	There was plenty of variety about April's weather. Towards the end there was a wintry spell with slight snow in Chingford, although in S.E. England there was more than 6 inches. Rainfall was about average.
May.	Over most of the country there were three warm and three cold and sunless spells. Rainfall average.
June.	Came near to breaking records for warmth and also for sunshine. The highest temperature of the year was recorded on 7th (90 degrees) and during the first week there were 5 days with temperatures in the 80s.
July.	There was no prolonged spell of fine weather, and July lived up to its reputation of being the most unsettled month of the year. It was a wet month with rainfall about an inch above normal.
August.	A disappointing month for holidaymakers, apart from the Bank Holiday week-end when temperatures rose to the 80s. There were no spells of fine weather and no high temperatures. S.E. England escaped much of the rain which fell in the North and West.
September.	There was little relief from the monotonous unsettled westerly type of weather. Again the S.E. escaped the heavy rains of West and North.
October.	The month was rather mild and very dry, rainfall being about 2 inches below average.
November.	Average temperatures, but rainfall nearly double the average, falling on 20 out of the 30 days.
December.	A cold month with ground frosts on 27 mornings. From 11th onwards the maximum temperature did not rise above 39 degrees.

STATEMENT OF ACCOUNTS

GENERAL

Receipts.

1949			
	Subscriptions—		
£625 8 6	Current	£683 19 0	
78 12 6	Arrears	29 0 0	
7 15 0	In Advance	9 17 6	
20 0 0	Entrance Fees	19 17 6	
£731 16 0			£742 14 0
7 13 6	Interest on Post Office Account		15 3 6
2 12 6	Interest on £75 War Stock, 3½%		2 12 6
—	Donations		2 0 0
—	Donation from Pioneer Club, Field and Archaeological Circle		12 0 0
£742 2 0			£774 10 0
57 15 6	Balance, 31st October 1949		21 8 3
£799 17 6			£795 18 3

PUBLICATIONS

£21 9 4	Sales of *London Naturalist*, *London Bird Report*, Reprints, etc.	£61 9 10
3 1 0	Advertisements in *London Bird Report*	5 1 0
72 0 0	Grant from The Royal Society	62 0 0
—	Donations	6 10 0
—	Sales of Christmas Cards	17 6 6
332 5 4	Balance to General Account	251 7 5
£428 15 8		£403 14 9

LEGACIES

Balance, 31st October 1949	£37 10 0
Further Proceeds of Sale of Books ex P. J. Hanson Bequest	3 10 0
	£41 0 0

BOTANICAL RECORDS

Balance, 31st October 1949	£34 13 1
Interest on Post Office Account	0 17 0
	£35 10 1

The Balances on Life Composition Account and Reserve Account remain at £285 and £90 respectively.

J. H. G. PETERKEN, Hon. Treasurer.

YEAR ENDED 31st OCTOBER 1950.

ACCOUNT.

Payments.

1949		
£102 14 6	Rent	£123 10 0
93 6 10	Programme Expenses (Printing and Postage)	87 5 9
43 14 11	Printing and Stationery	39 16 7
21 0 11	Postage—Secretaries and Treasurer	23 1 3
2 16 10	Insurance	2 19 5
5 0 0	Gratuities	4 0 0
7 5 0	Subscriptions	10 8 0
46 0 9	Sectional Expenses	44 2 5
4 2 0	Chingford Branch Expenses	2 18 9
0 19 7	Grant, "Birds of London Area"	3 10 10
76 0 0	Secretary's Honorarium	81 0 0
20 0 0	Library Expenses	20 0 0
—	Exhibition Expenses	2 19 10
—	Lecturers' Expenses	3 9 10
4 18 6	Sundry Expenses	1 0 0
—	Purchase of Books ex donation from Pioneer Club ...	12 0 0
18 4 1	Printing Map of Society's Area	—
332 5 4	Publications Account	251 7 5
£778 9 3		£713 10 1
21 8 3	Balance, 31st October 1950	82 8 2
£799 17 6		£795 18 3

ACCOUNT.

£428 15 8	Printing and Postage—*London Naturalist* and *London Bird Report*	£397 4 7
—	Christmas Cards	5 17 0
—	Sales Team Expenses	0 13 2
£428 15 8		£403 14 9

ACCOUNT.

Balance, 31st October 1950	£41 0 0
	£41 0 0

ACCOUNT.

Balance, 31st October 1950	£35 10 1
	£35 10 1

Audited and found correct,
9th February 1951.

E. B. BANGERTER, Auditor.
C. L. COLLENETTE, Auditor.

Obituary.

Philip Henry Cooke.

PHILIP HENRY COOKE, who died at Old Heathfield, Sussex, on 25th October 1950, was born at Maidstone, Kent, on 5th December 1859. He received his early education at Maidstone, took his B.A. at London in 1881, and entered holy orders. After serving as a curate in several parishes in the East End of London he was appointed in 1903 to the curacy of St. Matthew, Upper Clapton. It was while serving in this office that he made the acquaintance of the North London Natural History Society, which he joined in 1904. His main interests were in botany and archaeology, and he spent the early years of the century diligently searching the country areas of Essex, Hertfordshire and Middlesex for plants.

In 1914 he became Vicar of Ickleton in Essex, and in the following years did excellent work on the flora of the near-by county of Cambridgeshire, his efforts being acknowledged by A. H. Evans in his *Flora of Cambridgeshire*, published in 1939. During 1929 the Rev. Cooke retired from his living and returned to London, where he devoted himself to missionary work, a subject in which he had a life-long interest. In the 1930s he led a number of excursions and attended many of the field meetings of the Archaeology and Botany Sections; he also extended his plant hunting excursions to Surrey and Kent and added many specimens to the Society's herbarium. Possibly his best find was a well-grown patch of a rare grass, *Cynodon Dactylon* (L.) Pers. in South-west Essex. In 1943 he anonymously donated the sum of £30 to the Society, to be used towards the publication of a new edition of *Botanical Records of the London Area*, and in the same year took over the Curatorship of the Botany Section, which post he held until 1946.

D. H. K.

Official Reports for 1950.

Council's Report.

DURING the year the Society has gained 139 new Members, 17 Country and School Associates, 2 Branch Associates and 2 Affiliated Societies. These additions have raised the Society's membership to 1084 on 31st October, a net gain of 71 on last year's total. An analysis of the interests shown on the Nomination Forms of these new members gives the following figures:—Archaeology 13; Botany 26; Ecology 18; Entomology 13; Geology 8; Ornithology 106; Ramblers 4. After they have joined the Society, however, more members ask to join the Ecology Section than any other Section.

Members will have learnt with great satisfaction that Professor Munro Fox, F.R.S., who has already taken a lively interest in the work of the Society, of which he has been a distinguished member for many years, has agreed to become our Honorary President.

Miss Burt has resigned from the office of Syllabus Secretary and has been succeeded by Miss R. H. Griffiths. The work of compiling the Syllabus, in future to be called the "Programme," becomes increasingly arduous as the Society grows in membership and in its activities. The current 28-page issue is a measure of the Society's debt to Miss Burt, who has earned our grateful thanks for her work during the past two years.

In April the Society held the first Exhibition for more than ten years. The Exhibition, opened by Sir Graham Savage, Chief Education Officer of the London County Council, was held at the British Museum (Natural History). Our thanks are due to the Trustees and Director for their kindness in allowing us to use the Lecture Hall of the Museum, and we were particularly glad to be able to welcome both Sir Norman Kinnear, the retiring Director, and Professor de Beer, his successor. The thanks of the Society are also due to Mr. Kent, the organiser, and to all those who spent so much time in providing so excellent a display for the three hundred who attended, despite the rain.

The Society was also represented at the Exhibitions of the School Nature Study Union and the Geologists' Association by exhibits prepared by the Geology Section.

On the winding up of the Pioneer Field Club and Archaeological Circle, Mrs. Boyd Watt, who has long been an active member of this Society, with other members of the Circle generously decided to present our Society with £12 from the funds of that Circle for the purchase of books for our Library.

We have to record with regret the deaths of the following members during the past year: W. L. Colyer, Rev. P. H. Cooke, H. J. Jeffery, Major R. P. Napper, A. Richardson, and L. S. Simpson.

Nature Conservation Committee's Report.

The year has been one of great activity for the Chairman, Secretary and for most of the members of the Committee.

After a recommendation by the Committee for the provision of a bird sanctuary in Holland Park had been sent to the London County Council in November 1949, Lord Ilchester kindly conducted a small party of members over the grounds in February 1950, and in early April a detailed report was sent to the London County Council, the Nature Conservancy and other bodies.

A meeting and exhibition devoted to Nature Conservation was organised by the Royal College of Science Natural History Society and held on February 9th, 1950 at the Imperial College, and our Society was invited to take part. In the Exhibition, the Society's publications were displayed and sold and a map showing our recommended Conservation Areas was exhibited. At the Meeting afterwards, Prof W. H. Pearsall and Dr. Verona Conway spoke of the work of the Nature Conservancy and Mr. C. P. Castell dealt with the Conservation work of the Society in a paper entitled " What a Local Natural History Society can do."

Members will be gratified to learn that, in addition to the areas already scheduled as of national importance in the White Paper on Nature Conservation, a limited number in each county will be scheduled by the Nature Conservancy as " Sites of Special Scientific Importance." Once scheduled, these areas cannot be developed without previous consultation with and the approval of the Ministry of Town and Country Planning. In addition, the Conservancy are listing other areas which they will recommend to the County Councils for their sympathetic attention, referring them to the local Conservation Committee for advice. It seems likely that a good proportion of the Society's recommendations will be scheduled and that most of the remainder will be recommended by the Nature Conservancy.

In August, a request was received from the Nature Conservancy for the preparation of a detailed report on Middlesex within a few weeks and for reports on the other Home Counties to be sent in, if possible, by the end of the year. Through the efforts mainly of Messrs. Cramp, Kent and Ryall, it was possible, before the end of September, to send in a report on Middlesex in which birds and flowering plants were adequately dealt with, although, so far, we have little or no other information about other groups. The compilation of these reports is actively under way and already most County Representatives record considerable progress.

The Committee suffered a serious blow in the resignation of its Surrey Representative, Mr. R. M. Payne, who is about to leave the county, but the Committee was most fortunate in soon obtaining an enthusiastic successor in Mr. E. W. Groves. Miss Franks, Mr. Groves and Mr. Melluish have circularised members in S.E. London and Kent, in Surrey and in Hertfordshire appealing for information about their respective counties. Much additional information for Kent has come in, and Mr. Melluish reports that all the proposed reserves in Hertfordshire have been visited and ornithological reports are already available for some. Mr. Groves has made useful personal contacts with the staff of the Juniper Hall Field Centre and has received valuable help from the Assistant Warden, Mr. J. H. P. Sankey. He is also receiving the co-operation of some members of the Croydon Natural History Society.

Since the Middlesex Report was sent in, Osterley Park has been taken over by the Ministry of Works and put under the control of the Bailiff of the Royal Parks, and the Society has been asked to nominate a bird observer.

Various threats to the wild life of several of our public open spaces were dealt with. The few damp hollows and pools still left on Mitcham Common were to have been eliminated by the dumping of rubbish. A strong protest was sent to the Conservators, in co-operation with the Commons Preservation Society, the South Eastern Union of Scientific Societies and the Croydon Natural History Society. Our President visited the Clerk to the Conservators and at least a partial victory has been achieved as dumping is to be restricted to the areas formerly given over to agriculture and now to be converted to playing fields.

Through the agency of our members Mrs. Welch and Mr. F. R. Mann the Society was able to intervene and save trees and other plants on Ham Common and in Richmond Park.

At the request of the Commons Preservation Society, Messrs. Castell, Foster and Hayman submitted a joint report on the present management of Wimbledon Common, from the point of view of the naturalist, and the matter is still under discussion.

The deep concern of the Society at the proposed cutting up of Esher and Arbrook Commons with new arterial roads was expressed in a letter to the Nature Conservancy and their help sought. At a local enquiry, the Society was represented by Major Keywood. It has since been learned that, owing to the intense local opposition, it is unlikely that the scheme will be proceeded with.

The attention of the Committee was drawn by the Croydon Natural History Society to the precarious state of the famous Keston Bog and support was given to their appeal to the Bromley Council to take active steps to preserve the bog from excessive trampling.

CYNTHIA LONGFIELD, *Chairman.*
C. P. CASTELL, *Hon. Secretary.*

November 1950.

Chingford Branch Report.

This year, Chingford Branch held nine indoor meetings and twelve field meetings, indoor attendance averaged sixteen and field meetings six. As usual the lectures were varied in order to interest the tastes of all the members.

Mr. R. C. Homes gave an instructive talk on " Bird-watching."

Dr. Hayward spoke about the " Geological Foundations of Epping Forest," and all the local associates found something to reflect upon in this lecture.

Mr. Mugele gave a talk on " London's Water Supply," and later took a party over the Stoke Newington Water Works.

In March the members of the Chingford Branch were guests at a joint meeting with the Chingford Antiquarian and Historical Society. Our chairman, Mr. Pinniger, gave an illustrated lecture on " Butterflies" ; this was very warmly received by the audience and many questions were asked. Mr. Syms spoke about "British Hemiptera" ; this was illustrated with some of the finest slides that have been shown at a Branch meeting. Miss Longfield completed the Spring Session with one of her delightful travel films on " Ruins and Races of the Far East."

The Autumn season commenced with a discussion on " Summer Activities," with members bringing along many exhibits ; this we hoped would encourage our younger associates.

In October Mrs. Boardman spoke about "Fascinating Fungi" ; she showed many specimens and also some beautifully coloured slides.

The last meeting was a lecture about " The Earthworks seen in Epping Forest." This subject has not been dealt with before at the Branch, and Mr. Bennett, the speaker, was full of surprising information.

Mr. Pinniger became chairman in place of Mr. Vincent, and Mr. Forster joined the Chingford Branch Council.

During the year three new Branch associates were enrolled.

B. B. Knott.

Librarian's Report.

The Library continues to be widely used by members whenever there is a meeting at Keppel Street. Over a period of twelve months more than 420 books were borrowed with a maximum on any one evening of 39.

Binding is being kept well up-to-date. There have been several valuable additions by gift and purchase, and we are indebted to Mrs. Boyd Watt for the gift of the residual funds of the Pioneer Field Club for expenditure on books for the library.

Pressure on the space available is such that it will clearly be necessary to weed out some of the books which are never asked for.

In conclusion I should like to express my thanks again for the invaluable help afforded by the sectional librarians.

R. W. Hale, *Librarian.*

Sectional Reports.

Archaeological Section.

Indoor Meetings. Three sectional meetings were held during the year. On February 28th Mr. L. E. Tanner, M.V.O., F.S.A., gave an illustrated lecture on " The Topography of Westminster," covering the area from the earliest times to the present day. Mr. E. Yates, F.S.A., devoted his talk on April 25th to the subject of Manorial Dovecotes, their style and origin. In his illustrated lecture on " Scientific Aids to Prehistory " on October 31st Mr. I. W. Cornwall, B.A., showed among other things how the aeroplane reveals buried earthworks, jet steam is used to de-ice frozen mammoths in Siberia and plastics are used to move and preserve fragile relics.

Outdoor Meetings. Twelve were held. The Public Record Office Museum was visited on January 14th and many historic documents (including a special exhibition of notable Treaties) were exhibited and explained by Mr. Ede. Mr. I. W. Cornwall, B.A., received a party at the Institute of Archaeology on February 18th and showed some of the applications of laboratory technique to the preparation of archaeological specimens. On March 18th a small party under the leadership of Mr. W. C. Cocksedge made an impromptu visit to the National Gallery, following the breakdown of arrangements previously made to go elsewhere. The following month Mr. Cocksedge took a party to visit Lullingstone Church and the excavations in progress at the Roman Villa. The Herb Garden at the mansion was also visited. On May 14th Sir Edward Harrison led a party of archaeologists and geologists on a day's visit to Oldbury Camp, and explained its many interesting features. After tea the party visited Ightham Church. Upminster Windmill, now in process of restoration, was visited on June 10th, when the miller, Mr. H. Stone, gave an account of its history and led the party over it. The churches at South Mimms and Ridge were visited on July 22nd, under the leadership of Miss V. A. Staines. The archaeology of the Merstham Gap was the subject of an outing on August 20th led by Mr. W. Mackintosh. The main theme was the probable course of the Pilgrims' Way between Merstham and Chaldon Ridge. On September 23rd, Mr. H. W. Payton took a party to see Swakeleys House, in particular pointing out the old wall paintings. He later conducted the party round Ickenham Church. The pageantry of Archbishops and Royalty connected with Old Croydon Palace and Whitgift Hospital were brought vividly to mind by Mr. Ryde when showing a party round on October 21st. Again on November 18th Canon Stevens re-peopled the rainy drabness of Old Bankside with Shakespearean crowds coming across the river to see the plays and bear fights and make holiday in the Rose Gardens. He also showed interesting old parish records of Southwark Cathedral. On December 9th the interesting finds from recent excavations in Walbrook were exhibited and explained by Mrs. Noel-

Hume, of the Guildhall Museum, together with other general exhibits in the Museum.

Reading Circle. There are 18 subscribers to "Antiquity" and 12 to the "Archaeological News Letter."

W. C. Cocksedge, *Chairman.* Miss V. A. Staines, *Secretary.*

Botanical Section.

Membership. The section has now 246 members, an increase of 22 during the year.

Officers. Mr. E. B. Bangerter has agreed to accept the position of Programme Secretary, in addition to that of Representative on the Programme and Publications Committees. Miss E. M. Hillman has been elected to the committee of the Section.

Indoor Meetings. One General and four Sectional meetings have been organized, with an average attendance of 29. One meeting included an exhibition, by members, of specimens and work.

Outdoor Meetings. Ten excursions have been made, with an average attendance of 13. One meeting was held to cater mainly for beginners, and was well attended. Some localities, with plants seen, are as follows:—Broxbourne Woods, Herts. (*Dicranum majus* Turn.); Hampton Court (*Saxifraga granulata* L., *Saxifraga tridactylites* L.); Farningham, Kent (*Daphne laureola* L., *Dianthus armeria* L., *Aquilegia vulgaris* L., *Hypochœris glabra* L.); Wimbledon Common (*Cuscuta epithymum* (L.) Murr.); Kew to Richmond (*Allium roseum* L., *Atropa belladonna* L.); Church Cobham, Surrey (*Cuscuta europœa* L., *Potentilla argentea* L.); Bowers Gifford, Essex (*Bupleurum tenuissimum* L., *Petroselinum segetum* (L.) Koch); Whitewebbs Park, Herts. (*Ruscus aculeatus* L.).

Library. A classified list of County Floras has been compiled, for which thanks are due to Mr. C. P. Castell. It is hoped that the list will soon be duplicated and made available to members. A number of new books have been added to the library during the year.

Botanical Records. A new system of recording the flora of our area has been instituted, in which species are entered on printed cards. It is hoped that the publication of these records will begin in the 1950 *London Naturalist*, and will continue yearly until the series is complete in about 1958. Messrs. D. H. Kent and J. E. Lousley will act as joint editors.

Islington Public Libraries. From July until September this year the Botanical Section has provided material for exhibition in the children's sections of the above libraries. Thanks are due to Miss M. A. R. S. Scholey for the greater part of this work.

Botanical Circular. A duplicated circular has been sent to each member living locally. It includes some instructions for collecting and recording, and it is hoped that, by this, interest will be stimulated, and that a greater number of records and observations will be received.

D. H. Kent, *Chairman.* F. E. Wrighton, *Secretary.*

Ecological Section.

Membership of the Section is now 198, an increase of 12 during the year.

The Section has been responsible for the provision of two General Meetings, when lectures were given by our Honorary President, Prof. H. Munro Fox, F.R.S., on " Inland Waters and the Peculiarities of their Animal Life " on November 1st, 1949, and by Dr. G. F. Herbert Smith on " The Conservation of Nature " on May 2nd, 1950. Three Sectional Meetings were also held—January 10th, 1950, was devoted to short papers by members on " The Bombed Site Surveys in the City and at Walworth," and on February 14th, a lecture on " The Lives and Habits of some British Sea Shells " was given by the President of the Conchological Society, Mr G. L. Wilkins. September 19th was devoted to a Discussion on the Year's Work of the Section.

The official monthly Sunday Meetings at Bookham were attended by an average of 13 members. As an experiment, four Saturday meetings were also arranged on the afternoons of April 22nd and June 3rd and for the whole day of 29th July and 23rd September, with an average attendance of 8. The President of the Croydon Natural History Society and some of its members were conducted by the Secretary over Bookham Common on June 3rd and members of the Section demonstrated some aspects of the work of the Survey. On October 8th, the Secretary demonstrated the Geology of the Common to members of the Geological Section and, with their help, continued the investigations of surface geology by augering commenced last year. Messrs. Bangerter and Castell have prepared a preliminary Check List of Flowering Plants of the Common and duplicated copies are available to interested members.

The monthly Saturday afternoon visits to the City Bombed Sites were continued between April and October, under the leadership of Messrs. Currie and Wrighton. At the meeting of September 19th, it was agreed to continue the Bombed Site Survey during the coming year. It was pointed out that much of the time of the leaders had been taken up in showing casually visiting members round the Survey area. This had considerably reduced the output of useful work and it was decided to announce only one meeting in the Syllabus each half-year; this would be devoted to introducing members to the Survey and to the area and details of further meetings would be available on application to the leaders.

A joint excursion to Gomshall with the Geology Section was held on July 2nd under the leadership of Messrs. Ainsley and Castell. A traverse was made from the Folkestone Sands in the valley, through the Chalk to the Netley Heath Gravels on the top of the downs and the relation between the vegetation and geology was studied.

The Section took part in the Society's Exhibition on April 29th when aspects of the survey work in the City and at Bookham were demonstrated.

Thirty-five members subscribe to the *Journal of Ecology* and *Journal of Animal Ecology* Reading Circles.

G. Beven, *Chairman.* C. P. Castell, *Secretary.*

Entomological Section.

The year saw no new extension of the Section's activities, and whilst attendances at meetings were maintained it cannot be said that really adequate support was given by the membership of nearly 150. The average attendance at sectional meetings during the year was 25.

Three indoor meetings were held during the period covered by this Report. On February 7th, at a general meeting, Mr. R. L. E. Ford gave a most entertaining talk on "Reminiscences of a Professional Naturalist," and at a sectional meeting on April 18th Dr. de Worms spoke on "Some Aspects of the Distribution of British Macro-lepidoptera," indicating the main factors which influence the distribution of lepidoptera, viz., food-plants, climate and human agency, and mentioning species associated with particular types of terrain. He gave instances of changes in distribution, and described certain anomalies in distribution and racial differences within species. A sectional meeting on September 12th devoted to Exhibits and Short Notes by Members was again very successful.

At the Annual Exhibition of the Society held on April 29th a number of entomological exhibits were staged, and the Section can be said to have contributed creditably to the success of the day.

Field meetings were held during the year at Bookham Common, Ranmore Common, Haslemere, Epsom, Horsley, Boxhill, Mickleham Downs, Oxshott, High Halstow, Epping Forest, Broxbourne, Copse Wood and Wicken Fen, the last being a joint excursion by coach with the Botanical Section. The average attendance (excluding Wicken Fen) was 5. Some of the more noteworthy insects seen were as follows:—

Haslemere (21st May)—*Leptidea sinapis* (Lep.).

Wicken Fen (18th June)—*Silis ruficollis, Agapanthia villosoviridescens, Chrysomela graminis, Cryptorrhynchus lapathi, Cryptocephalus fulvus* (Col.); *Eurygaster testudinarius* (Hem.); *Papilio machaon* (Lep.).

Epping Forest (30th July)—*Dromius agilis, Cryptocephalus fulvus, Galerucella tenella, Hypophloeus bicolor, Apion sanguineum, Rhinoncus castor, Scirtes hemisphaericus* (Col.).

High Halstow (3rd September)—*Ophonus rotundicollis, Aphodius foetens, Emus hirtus, Apion limonii* (Col.).

Membership of the Section rose to 148, an increase of 4 since the previous year.

Mr. M. Niblett and Mr. J. F. Shillito joined the committee at the beginning of the year. Mr. L. C. Garrett-Jones was invited to join, but was prevented from doing so by his departure for Persia.

Twenty-four members now subscribe to the Section's reading-circles.

A list of the entomological books in the library is being compiled, and it is hoped to circulate this to members early next year (1951).

The re-arrangement of the collections is proceeding satisfactorily, and a few species of insects not hitherto represented in our cabinets have been added, viz., *Eurynebria complanata*, *Cassida murraea* and *Ips sexdentatus* (Col.). Donations of insects in all orders would be most welcome.

CYNTHIA LONGFIELD, *Chairman.* R. M. PAYNE, *Secretary.*

Geological Section.

Membership of the Section has increased during the year by 16 and now stands at 88, including 5 Country Associates. Nineteen field meetings were held, at which the average attendance was 16, and the Section was responsible for 4 indoor meetings. At the Society's Exhibition in April the Section was represented by a two-fold exhibit under the direction of the Chairman assisted by other members. One exhibit illustrated the Geology of the London District while the other showed the progress made by the Temporary Sections Committee. At the biennial exhibition of the School Nature Study Union the Section represented the Society. The work of the Temporary Sections Committee was also demonstrated by Dr. Hayward at the Annual Reunion of the Geologists' Association.

Indoor Meetings. At the Exhibition of Specimens held at Keppel Street in January the following collections were shown:—

Waltonian (Red Crag) Fossils. Mrs. B. Ainsley.
Photographs taken during the Easter Field Meeting to the Isle of Wight. R. E. Butler.
Flint Implements. J. N. Carreck.
Fossils from the Weald Clay of Capel, Surrey. M. Kerney.
Specimens collected on the Isle of Wight Meeting. B. Ainsley.

At a Sectional Meeting in March Dr. J. F. Hayward gave a lecture entitled "Geology as a basis for the Field Naturalist." In June a Sectional evening was devoted to a number of sound films concerning Oil Geology which had been kindly loaned by the Petroleum Film Bureau. At a General Meeting in October Dr. K. P. Oakley gave an account of the latest work concerning Man's ancestors in his lecture entitled "Recent Work on Fossil Man."

Field Meetings. (a) Museum Visits, etc. On January 21st, Mr. W. H. C. Ramsbottom gave a demonstration at the Geological Museum on "The Isle of Purbeck" and on February 11th Mr. S. E. Ellis demonstrated "Some New Exhibits in the Mineral Gallery" at the British Museum (Natural History).

On December 2nd the Section visited the Imperial College of Science and Technology. The party was met by Prof. H. H. Read who gave an introductory talk on the History and the work of the Geology Department. Mr. W. S. Pitcher then showed a number of coloured lantern slides of rock sections as seen through the Petrological microscope by ordinary transmitted light and by polarised light. A number of demonstrations were given by members of the Staff in various sections of the

Department and much interesting new apparatus was seen. In the Spectroscopy Laboratory a method of indicating the presence of hidden deposits of ore-metals by the detection of trace elements in vegetation was under investigation.

(b) Out-door Meetings. On Saturday, March 11th, twenty-eight members met the leader, Mr. R. E. Butler, at South Mimms and proceeded to the Mimmshall Brook, inspecting the Water Works on the way. At Water End the swallow-holes were found to be in an excellent condition for examination and members were able to see the water descending into the ground to emerge again after some 10 miles as springs along the Lee valley. On Saturday, March 25th, Dr. J. F. Hayward and Mr. B. Ainsley conducted a party over a number of sites in Central London where they had been recording temporary geological sections. A visit to Hampstead Heath was made on Friday, April 28th, under the leadership of Dr. J. F. Hayward.

A most successful meeting was held during Easter in the Isle of Purbeck. Twenty-eight members assembled at the Headquarters at Swanage on Thursday, April 6th, and in the evening the leader (Mr. C. P. Castell) gave a short talk on the Geology of the area and the programme of excursions to be carried out. A fifteen-page Programme, written and produced by the leader, was distributed. On April 7th the party proceeded to Lulworth Cove by private coach. The Fossil Forest was visited; here were seen silicified tree-stumps of cycads and conifers imbedded in calcareous tufa. At Mupe Bay the magnificent view across Worbarrow Bay to St. Alban's Head was enjoyed. Returning to Lulworth Cove the party explored the coast westward past Stair Hole and as far as Durdle Door. On the following day the party went from Swanage Quay by boat along the coast past Ballard Point in order to see the remarkable fault in the Chalk visible in the cliff. At Studland Bay a very perilous landing was made along a derelict jetty from which the floor-boards had been removed. A return was made along the beach of Studland Bay (Reading Beds), over Ballard Down (Chalk) and round Swanage Bay. On the way the party was met by Mr. Heap, a well known local geologist, who pointed out some exposures of fossiliferous Lower Greensand and the junction of the Lower Greensand with the Gault Clay. At Peveril Point the Secretary conducted members along the beach past the classic section of Purbeck Beds as far as the tide would permit. On Sunday morning some members walked over the cliffs towards Dancing Ledge in search of sea-birds, whilst others spent the morning in Durlston Bay searching for the mammal-bed which Mr. Heap had made the subject of a talk the previous evening when he had described his discoveries and exhibited specimens. In the afternoon the party visited Studland Heath in order to observe the development and ecology of sand-dunes. On the return journey members saw the Agglestone Rock—a geological monument. On Easter Monday, after proceed-to Worth Matravers by coach, the party walked to Chapman's Pool (Kimmeridge Clay) but by that time the weather had so deteriorated that examination of the section was almost impossible. Eight members only, led by the Secretary, ventured by the cliff path to St. Alban's Head under appalling conditions. The rest of the party proceeded by a more sheltered inland route to Winspit Quarry where both parties again met. Here the owner, Mr. F. Harris, kindly conducted the party round explaining the workings of the Quarry. In the afternoon a long walk to Kingston was made in pouring rain so that after tea the return journey by coach was greatly appreciated. On Tuesday morning most members went by train to Corfe Castle and walked to Blashenwell Farm to see and collect from the Holocene Calcareous Tufa.

On Sunday, May 7th, Dr. T. Barnard conducted a party from Clandon Station, past Newlands Corner, calling at a number of Chalk pits on the way, to Shere where an exposure of Bargate Beds was examined. The return was made up the escarpment and across Netley Heath to Horsley Station. A joint meeting was held on Sunday, May 14th, with the Archaeology Section to Oldbury Camp under the leadership of Sir Edward Harrison. On the following Sunday another joint meeting with the same Section was held, this time to Borough Green and Ightham, led by Mr. J. C. Carreck. Gault Clay fossils were collected and " Kentish Rag " and " Ightham Stone " seen. The picturesque gorge cut by the river Shode in Hythe Beds was visited.

An excursion was made to the famous Sponge Beds at Faringdon by motor-coach with Mr. G. F. Elliott on Sunday, June 4th. Several of the large quarries were examined and members obtained good collections of fossils from the Lower Greensand Sponge Gravels. Tring was visited on Sunday, June 18th, when Mr. B. Ainsley led a party to the large Portland Cement quarry at Pitstone. Fossils were collected from the Lower Chalk (Totternhoe Stone). The upper part of the section is in Coombe Rock consisting almost entirely of shattered chalk. Festooning and other results of frost were observed. After tea at Ivinghoe the return to Tring Station was made past the slopes of Ivinghoe Beacon and over Pitstone Hill.

A joint meeting with the Ecology Section was held on Sunday, July 2nd, to Gomshall to study the relation between the geology and the fauna and flora.

Mr. M. Kerney met a small party at Ockley Station on Sunday, July 16th, and a visit was made to Knole Farm pit where fossil insect remains were collected from the Weald Clay. Afterwards at Clockhouse pit examples of ripple-marked sandstone and fish teeth and scales were collected. At Warnham " Paludina Marble " was seen, the party returning from Warnham Station.

The Lewes district was visited by coach on Sunday, October 15th, when Mr. I. E. Higginbottom led the party first to Castle Hill, where an excellent view of the surrounding country was obtained. A series of quarries was visited—ranging from Weald Clay to Chalk. At Newhaven Cliffs the Eocene beds could be seen resting unconformably upon the underlying Chalk.

On Saturday afternoon, November 11th, 15 members were shown over the Building Research Station, Garston, Watford.

Temporary Sections Committee. The important work of recording temporary geological sections has progressed and reports received during the year will be found elsewhere in this volume.

The thanks of the section are due to those geologists who so willingly conducted field meetings and to the owners of quarries and works for permitting the Society to visit their properties.

JOHN F. HAYWARD, *Chairman.* B. AINSLEY, *Secretary.*

Ramblers' Section.

The membership of the Section has not increased during the year, and remains at about 70.

Two sectional indoor meetings were arranged, the first being held on the evening of May 23rd, when an interesting talk was given by Mr. C. Foster, F.R.P.S., on " Clouds and Weather," illustrated by some excellent photographic cloud studies and diagrams shown on the screen.

The second meeting was held on the evening of December 12th, when Mr. J. Whittaker, F.R.G.S., F.R.H.S., gave an illustrated lecture on Iceland, its history, geography and people, and his personal experiences in that country.

Twelve outdoor meetings were arranged, the average attendance being eleven. The places visited were as follows:—

HUTCHINSON HOUSE, which has an extensive collection of paintings of " British Sports and Pastimes."

ROXFORD COPSE, Herts., where the Winter Aconite is naturalized, and at the time of our visit carpeted the copse with its yellow flowers.

UNTRODDEN SURREY PATHS in the Horsley, Wisley and Ockham area, where many spring flowers were in bloom.

THEYDON BOIS AND DEBDEN HOUSE. A forest walk, which included a visit to Debden House, a " Residential Centre for Further Education," where there is an attractive garden.

HOLMBURY HILL. This ramble was diverted to Abinger, owing to wet weather.

BASINGSTOKE CANAL. The aquatic plants seen in bloom on this ramble included Frog-bit, White Nymphaea, Yellow Nuphar, Fringed Water-lily, Water Plantain, Arrowhead, and Flowering Rush.

HATFIELD HOUSE, the Hertfordshire home of the Marquis of Salisbury.

EPPING TO HARLOW, by forest paths and open agricultural country to the old town of Harlow, the centre of one of the proposed satellite towns.

HERTFORD TO WARE. A district of woodland, and rich meadows skirting the rivers Beane and Lea. The early 12th century church of St. Leonards at Benigo with remains of 13th century paintings, the Priory Gardens at Ware, and the grounds of Hertford Castle were visited. Amongst other interesting birds seen on this ramble was an albino Robin.

LEATHERHEAD AND FETCHAM DOWNS. The autumn tints and fruits were the feature of this ramble.

THE GUILDHALL ART GALLERY. Owing to the visit of Queen Juliana of the Netherlands, this was unfortunately closed, but the party were able to see through the Guildhall and The Crypt.

THE VICTORIA AND ALBERT MUSEUM, where the party had a lecture on English Furniture and Decoration, and Bow and Chelsea China.

At the Exhibition illustrating the Society's work held at the Natural History Museum, South Kensington, the Ramblers' Section arranged an exhibit comprising a poster statement setting forth the origin and aims of the Section; a map with the localities starred that were visited by the Section during the year; books and pamphlets descriptive of the houses, museums, and art galleries where visits had been made; and copies of the literature circulated to the members of the Ramblers' Reading Circle.

The Reading Circle members have received the *Journal of the Commons, Open Spaces and Footpaths Preservation Society*, also the periodicals *Out-of-Doors* and *The Countryman*. From the grant of £2 from the Library Fund, and £3 from the Boyd Watt Gift, have been purchased copies of the *County Series* of handbooks dealing with the Society's area.

H. SPOONER, *Chairman*. R. C. HODGSON, *Secretary*.

Ornithological Section.

Membership. During the past year the membership increased by 67 and the total reached 763, made up of 653 Full Members, 73 Country Associates, 19 Branch Associates, 15 School Associates and 3 Affiliated Societies.

Lectures. Twelve indoor meetings were held, of which three were General Meetings arranged by the Section. The first general meeting was devoted to a talk by Major Buxton on " Cock Capercailzie in Display, and Roe in their Rings." The second was a " Discussion on Bird Ringing with Demonstrations " by Mr. D. Goodwin and Mr. G. E. Manser. At the third general meeting Major Cawkell was to have spoken on " The Birds of Pett Level Walland and Romney Marshes." However, a few weeks before the meeting Major Cawkell had to go abroad, to the Falkland Islands, and his place was taken by Mr. R. Cooke, who spoke on the same subject.

Of the Sectional Meetings, two were assigned to Short Papers by Members, the speakers being: Mr. J. S. Wightman on "Some Norwegian Birds" and Mr. R. W. Hale on "Bird Books"; Mr. R. S. R. Fitter spoke on the " International Ornithological Congress " and Mr. C. B. Ashby discussed the difficulties of distinguishing between Glaucous and Iceland Gulls in the field, using as illustrations two films kindly lent for the occasion by Mr. G. Kay.

Sectional Meetings were also devoted to the following:—The Rev. E. A. Armstrong on the " Integrative Study of Bird Behaviour." Mr. P. E. Brown on " Reed and Sedge Warblers." Mr. Ian Thomson on " Shetland and Some Dutch Birds." Mr. R. C. Homes and Mr. C. W.

G. Paulson on the "Identification of Some Waders." One meeting was devoted to a discussion of the work of the Section.

Personnel. This year Mr. W. D. Melluish was succeeded by Mr. L. Baker as Secretary and Mr. H. O. Jones became Minuting Secretary. Mr. J. S. Beesley followed Mr. C. Hughes as Field Meeting Secretary, while Mr. J. E. Taylor succeeded Mr. B. A. Richards as Bird Ringing Secretary. At a meeting of the Committee it was decided that two members of the committee should retire by seniority each year and should not offer themselves for re-election for a further period of one year. Under this rule Miss C. E. Longfield and Mr. R. W. Hale offered their resignations. During the year Dr. G. E. Beven also resigned. After a ballot at the Annual General Meeting the following were elected to the Committee:—Messrs. Cramp, Homes, Melluish, Ryall, Richards and Teagle.

We record with regret the death of Mr. W. L. Colyer, who, though not often seen at our meetings, was indefatigable as an observer. Mr. Colyer was Official Observer for Richmond Park in 1940. Both in this capacity and as a contributor to the *London Bird Report* he made many thorough and detailed additions to our knowledge of the birds of Richmond Park.

Annual Exhibition. At the Annual Exhibition at the British Museum (Natural History) the Section contributed an exhibit at which various aspects of its current activities were displayed.

Field Meetings. Forty-eight field meetings were held this year, five of which were coach trips to coastal areas. The average number attending was 20.

Reading Circles. Reading Circles maintained, as in 1949, 14 copies of British Birds in circulation. Twenty-one readers continue to receive the *Scottish Naturalist*, of which 2 copies are in circulation. Sixteen members receive *Bird Banding* and *The Auk* goes to the same number. The reading circle for *The Ibis*, started this year, numbers 24, and our thanks are due to Mr. V. R. Garrett for providing a second copy, thus making it possible to accept so large a number of readers.

Library. The number of books in the section's library was increased by 14 during the year, and books are borrowed at the rate of 20 to 30 at each meeting. As was to be expected there has been a great demand for *Birds of the North Kent Marshes* by E. H. Gillham and R. C. Homes. With the purchase of Bolam's *Birds of Northumberland* with Pioneer Field Club funds, our collection of county histories is now complete. A hand list has been completed and is on sale at each meeting.

Curator's Report. During the year there were three additions to the skin collection. A waxwing from Bromley, presented by Mr. S. H. Chalke, a puffin from Cliffe presented by Mr. E. H. Gillham, and a woodcock from Horsham presented by Mr L. Baker.

The egg collection has been increased by the gift of a complete clutch of black-headed buntings eggs from Mr. K. P. Keywood and Miss L. J. Johns has donated a small collection including eggs of Dartford warbler, woodchat shrike and spotted crake.

The section would like to receive from members more good photographs of birds and bird habitats in our area.

Ringing. The number of birds ringed in the year 1949/50 was more than treble that of the previous year. 33 ringers sent in schedules representing 3,085 birds of 76 different species.

The largest single contribution to this total was made by the group of members who have been ringing Starlings at their roosts in Trafalgar Square.

Another contributory factor to the year's large total was the increase in the number and success of members who have been trapping birds in their gardens.

Of the recoveries notified this year the following are of interest:—

Starling ringed in Trafalgar Square on 20th December 1949 by B. A. Richards was found dead at Katwijk, North Holland, on 4th June 1950.

Female Chaffinch trapped and ringed by J. Farrand at Westbere Road, N.W.2, on 31st December 1949, was killed by a cat at Lulea River, North Sweden, latitude 66°, on 12th August 1950.

Blackbird ringed as a nestling on 13th May 1945, on Royal Wimbledon Golf Course by J. A. Wigzell, was found dead at Wimbledon on 11th March 1950.

Black-headed Gull ringed by T. L. Bartlett on 19th January 1946, at Putney, was caught and released at Putney on 2nd February 1950.

Heron ringed at High Halstow, Kent, on 26th May 1947 by B. A. Richards was found dead in January 1950, at Ashton Keynes, Wiltshire.

Birds of the London Area, 1900-1950. The biggest proportion of the research necessary to complete this work has now been made. Detailed lists, particularly of breeding species are still required. Work on the sorting and checking of information continues.

Field Work. A complete census of herons, great-crested grebes, black redstarts and little ringed plovers was carried out again this year, and the winter duck census was continued for the fourth year. The enquiry into the distribution of swifts, swallows and house-martins was concluded and the results were published in the *London Bird Report.* The survey of selected gravel pits was continued. The London starling inquiry, in its second year, has begun to yield many interesting facts 915 birds have been ringed and 63 recovered to date. A series of comparative weights, measurements and plumage changes have been obtained. Regular weekly counts of the birds roosting in the central areas have been made and fly-lines into the roosts are being mapped.

Recording. Full details of recording activities are published separately in the *London Bird Report*, which contains important papers by members as well as the annual summary of the more important and interesting bird-occurrences during the year.

E. R. Parrinder, *Chairman.* L. Baker, *Secretary.*

Additions to List of Members

(From 5th September 1950 to 3rd July 1951)

Members:

Adams, Miss N. G., Park Gate, 47 Vicarage Road, Hampton Wick, Kingston-on-Thames, Surrey. (Orn.)
Armstrong, P. O., Fairholme Private Hotel, 42 Hampton Road, Teddington, Middx. (Bot., Ent., R.)
Arnold, A. A. J., 3 St. George's Avenue, Kingsbury, London, N.W.9. (Orn., R.).
Ashmole, N. P., 19 Craven Hill, London. W.2, and at Bryanston School, Blandford, Dorset. (Orn.)

Bailey, Miss S. A., 83 Eden Way, Beckenham, Kent.
Barfield, Miss A. J., 80 Shrewsbury Avenue, Kenton, Harrow, Middx.
Barren, Mrs. J., 30B Campden Grove, W.8. (Orn.)
Barrow, Miss J. S., Killigarth, 39 Riddlesdown Road, Purley, Surrey. (Orn.)
Barton, Miss M., 38 Swyncombe Avenue, Ealing, London, W.5.
Billington, Miss U., 3 Brunswick Mansions, Handel Street, London, W.C.1. Ent., Orn.)
Blackmore, M., 80 Nicholl House. Woodberry Down, London, N.4. (Mam., Orn.)
Blagden, Mrs. V. M., Spindlewood, Abbots Drive, Virginia Water, Surrey. (Mycol., Orn.)
Braham, Miss L., Lynton, Handel Close, Edgware, Middx. (Orn.)
Briscoe, Miss E. J., 58 Fairlawn Grove, Chiswick, London, W.4.
Brisley, Miss C. Y., 121 Arthur Road, Wimbledon Park, London, S.W.19. (Ecol., Orn.)
Brown, Miss E. P., 15 Phillimore Gardens, London, W.8. (Orn.)
Brown, Miss P. M. B., 6 Cambridge Terrace, Regent's Park, London, N.W.1.
Bullock, Miss M. F., 28 Deanhill Road, East Sheen, London, S.W.14. (Orn.)
Burridge, Miss D., 16 Bullens Green Lane, Colney Heath, near St. Albans, Herts. (Bot., Orn.)
Burton, D. B., 33 West End Court, Priory Road, Hampstead, London, N.W.6. (Orn.)
Chadwick, G., 16 Sutherland Street, London, S.W.1. (Arch., Bot., Geol.)
Chambers, R. H., 34 Marlborough Lane, Charlton, London, S.E.7.
Chanter, Miss J. C., 57 Fladgate Road, Leytonstone, London, E.11. (Ecol.)
Chaplin, Miss M., 38 Belgrade Road, Hampton-on-Thames, Middx. (Bot., Geol., Orn.)
Chettleburgh, M. R., 45 Hazelbrouck Gardens, Hainault, Ilford, Essex. (Orn.)
Churches, Miss E. W., The White House, Colebrook Street, Winchester, Hants. (Bot., Orn.)
Clark, Miss H. S., 29 Sandringham Road, Wood Green, London, N.22. (Orn.)
Clinkskel, P. G., 40 Blakes Avenue, New Malden, Surrey. (Orn.)
Commander, Miss G. N., 46 The Pryors, East Heath Road, London, N.W.3. (Orn.)
Cornall, D. F. J., 144 Phyllis Avenue, Motspur Park, New Malden, Surrey. (Orn.)
Cratchley, Miss M., 92 Oakwood Road, Hampstead Garden Suburb, N.W.11. (Arch., Orn.)
Crowe, R. W., Grey Tree, South Nutfield, Surrey. (Orn.)
Cummings, Miss S., 19 Fitzjames Avenue, East Croydon, Surrey.
Curtis, A. S., 17 Parkhill Road, Hampstead, London, N.W.3, and at School House, Aldenham School, near Elstree, Herts. (Ecol., Geol.)
Cutbill, I. H., Danebury, Tyrrell's Wood, Leatherhead, Surrey. (Orn.)
Davies, O. J. H., The Oak House, Crossways, Shenfield, Essex. (Orn.)
Day, Miss S. R., F.R.G.S., 47 Argyll Road, London, W.8. (Bot., Orn.)
Dear, Miss K. M., 65c Belsize Park Gardens, London, N.W.3. (Ent., R.)
Dehn, P., 19 Bramerton Street, Chelsea, London, S.W.3. (Orn.)
Dickinson, P. W., 20 Willow Road, Hampstead, London, N.W.3. (Orn.)
Dubery, Miss J. A., 53 Leghorn Road, Harlesden, London, N.W.10. (Orn., R.)
Farr, Miss M. R., 1 Belsize Grove, Hampstead, London, N.W.3.

Fells, W. A., 101 Sunnyfield, Mill Hill, London, N.W.7. (Orn.)
Firth, Mrs. M., 32 de Vere Gardens, London, W.8. (Bot., Orn.)
Fisher, P. B., White Gates, Croxley Green, Herts. (Geol.)
Fishlock, A., 86 Hartley Down, Purley, Surrey. (Orn.)
Fowler, Miss D., c/o Miss Sibley, 37 Sloane Street, London, S.W.1. (Bot., Orn.)
Freeman, G. D., 188 Domonic Drive, New Eltham, London, S.E.9. (Arch., Palaeontology.)
Freer, J. S., Lensbury Club, Broom Road, Teddington, Middx. (Orn.)
Furse, E. J., "Devonia," Durham Road, Bromley, Kent. (Araneae, Hym.)

Giffard, Miss N. D., 12 Cornwall Gardens, London, S.W.7. (Orn.)
Godfrey, D. A., 59 Canonbury Court, Upper Street, Islington, London, N.1. (Orn., R.)
Goodfellow, R. F., A.M.I.Struct.E., 93 Chippenham Road, W.9. (Ecol., Geol.)
Goodfellow, Mrs. Y., 93 Chippenham Road, W.9. (Ecol., Geol.)
Goss, J. G., address not known. (Orn.)
Gould, K. J., 9 Amyand Park Road, Twickenham, Middx. (Orn.)
Graham, Rex., F.L.S., Mint House, Woodside Road, Northwood, Middx. (Bot., Geol.)
Grasemann, Miss A., 12 Dry Hill Road, Tonbridge, Kent. (Bot., Ent., Orn.)
Guthrie, D. M., 6 Mall Studios, Parkhill Road, Hampstead, London, N.W.3. (Entom.)

Harris, Mrs. E. A., Pedwardine, Pinner Hill, Middx.
Harvey, D. W., 34 Gantshill Crescent, Ilford, Essex. (Arch., Geol.)
Hawkins, G. F., 34 Hollington Crescent, New Malden, Surrey. (Orn.)
Hawkins, R. J., 34 Roundwood Way, Banstead, Surrey. (Orn.)
Hemmings, L. G., L.D.S.(Eng.), Maybury Lodge, High Street, Thames Ditton, Surrey. (Orn.)
Henty, A. J., 427 Chipstead Valley Road, Coulsdon, Surrey. (Orn.)
Higgins, J. F., St. Mary's Hospital Medical School, Paddington, London, W.2. (Orn.)
Hobart, Miss M. H., 54 Birkhall Road, Catford, London, S.E.6. (Ecol., Orn.)
Hobbs, J. N., 27 Desmond Road, Watford, Herts. (Odonata, Orn.)
Hocken, A., 14 Manor Avenue, Northolt, Middx. (Bot., Orn.)
Hollick, Miss V., 14 Randolph Crescent, Maida Vale, London, W.9. (Orn.)
Howard, Miss M., 50 Greencroft Gardens, London, N.W.6. (Orn.)
Howie, Miss P. M., Sarum Hall, 51 Eton Avenue, London, N.W.3. (Orn.)
Hughes, Mrs. J., Nara, 7 Nascot Wood Road, Watford, Herts. (Orn.)
Hutchinson, C. C., Elmhurst, High Road, South Woodford, London, E.18. (Orn.)

Jeffreys, A. H., 13 Cheyne Gardens, London, S.W.3. (Orn.)
Jeneid, M., 10 Lowndes Street, London, S.W.1. (Orn.)
Johnston, Miss J., 99 South Norwood Hill, London, S.E.25, and at 1 Clarence House, Marina, Bexhill, Sussex. (Orn.)
Jones, A. W., 99 Ashmore Road, Paddington, London, W.9. (Bot., Ecol., Ent.)
Jones, Miss D. Picton, Portsmouth Club, 12 Grosvenor Place, London, S.W.1. (Arch., Bot., Ecol., Orn.)

Larwood, G. P., F.G.S., 376 Bowthorpe Road, Norwich, Norfolk, and at Men's Hall of Residence, Queen Mary College, Elmhurst High Road, London, E.18. (Ecol., Geol., Prehistory.)
Leston, D., F.R.E.S., F.Z.S., 44 Abbey Road, London, N.W.8. (Ecol., Ent., esp. Heteroptera.)
LeSueur, Mrs. K., 23 Rosary Gardens, South Kensington, London, S.W.7. (Bot.)
LeSueur, K. H., 23 Rosary Gardens, South Kensington, London, S.W.7.
Letts, B., 183 Windmill Lane, Greenford, Middx. (Orn.)
Leutscher, A. G., 7 St. Margaret's Court, E.12. (Herpetology.)
Levy, Miss R. E., 28 Heath Drive, Raynes Park, London, S.W.20. (Bot., Geol.)

McCall, J. H., Stone House, Stone, near Dartford, Kent. (Orn.)
McDowall, R. S., 8 Oakleigh Avenue, London, N.20. (Orn.)
Manuel, Miss D. E., address not known. (Ecol.)
Marrable, A. W., B.Sc., 24 Thorncliffe Road, Southall, Middx. (Orn.)

Marsh, Miss M. E., 26 Dry Hill Park Road, Tonbridge, Kent. (Geol., Orn.)
Martin-Jones, Miss M., 31 Maunsel Street, London, S.W.1. (Orn.)
Maskell, Miss E., c/o Maria Grey College, 300 St. Margaret's Road, Twickenham, Middx. (Bot., Ent., Orn.)
Melderis, Dr. A., 2 Lee Terrace, Blackheath, S.E.3. (Bot.)
Morgan, Miss M. A., Harlington Rectory, Hayes, Middx. (Orn.)
Mulholland, Mrs E., 139 Bedford Court Mansions, Bedford Square, London, W.C.1. (Orn.)

Nisbet, I. C. T., 24 Penwerris Avenue, Osterley, Middx. (Orn.)
Norbury, Mrs. L. E. C., 19 Harley Street, London, W.1. (Bot., Orn.)

Ormerod, E. C., 4 Cairnfield Avenue, London, N.W.2. (Bot., Ent., Orn.)
Osborn, Miss J. H., c/o Nurses' Home, Guy's Hospital, London, S.E.1. (Orn.)

Parr, R. W., 65 Eastmont Road, Esher, Surrey. (Arch., Geol., Orn.)
Parsons, R. J., 19 Alexandra Gardens, Hounslow, Middx. (Arch., Geol., Orn.)
Pascal, Miss R., 21c Bramshill Gardens, London, N.W.5. (Orn.)
Pearson, J. D., Flat 3, 78 Greencroft Gardens, London, N.W.6. (Bot.)
Pettersson, M. L. R., M.A., Ph.D., F.L.S., 9 Mellows Road, Ilford, Essex. (Graminae.)
Phear, Dr. D. N., 109 Lancaster Gate, Paddington, London, W.2. (Bot., Orn.)
Phear, Miss E. A., Sussex Lodge, Sussex Place, Regent's Park, London, N.W.1. (Bot., Orn.)
Pitman, Capt. C. R. S., C.B.E., D.S.O., M.C., Flat 9, No. 12 Chelsea Embankment, London, S.W.3. (Orn.)
Playle, B. T., Flat 2, 65 Ladbroke Grove, London, W.11. (Orn.)
Pocock, S. A. J., B.Sc., F.G.S., 10 Ravensbourne Park, Catford, London, S.E.6. (Geol.)
Pratt, N. H., 39 Broadwood Avenue, Ruislip, Middx. (Orn.)
Prichard, Miss E., 25 Westbourne Terrace, London, W.2. (Orn.)

Rapley, E. E., 255 Wanstead Park Road, Ilford, Essex. (Arch.)
Ray, C. M., 12 Ashley Gardens, Petersham, Surrey. (Arch., Orn.)
Reynell, Mrs. S., Wollaston, Oakleigh Park North, London, N.20. (Orn.)
Rigden, R. G., 10 Willrose Crescent, Abbey Wood, London, S.E.2. (Ent., Orn.)
Roberts, J. T.. 43 Campden Hill Square, London. W.8
Rook, Miss D. A., 55 Chesterfield Road. West Ewell, Surrey. (Orn.)
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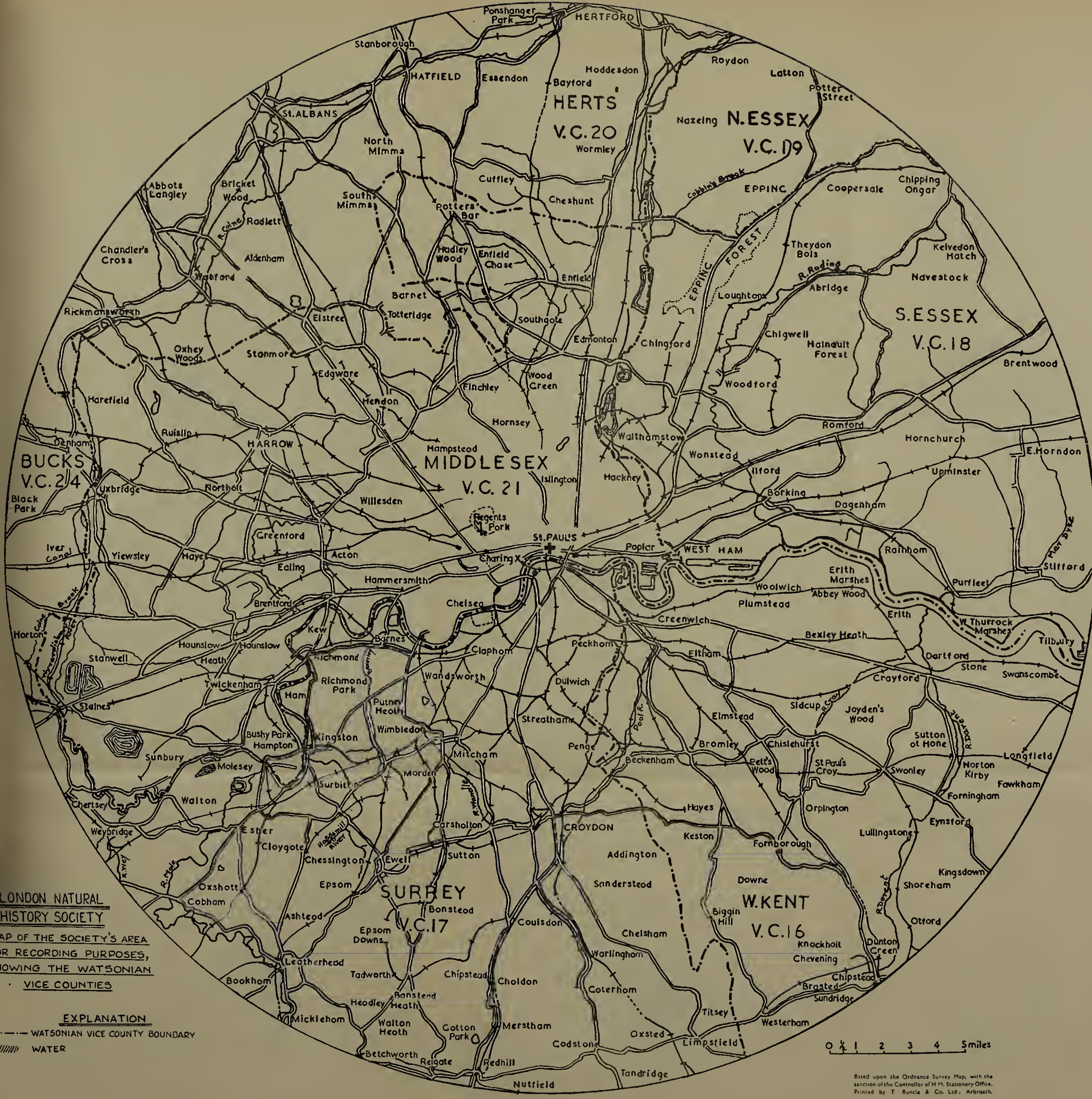

LONDON NATURAL HISTORY SOCIETY

MAP OF THE SOCIETY'S AREA FOR RECORDING PURPOSES, SHOWING THE WATSONIAN VICE COUNTIES

EXPLANATION

—·—·— WATSONIAN VICE COUNTY BOUNDARY

////// WATER

Based upon the Ordnance Survey Map, with the sanction of the Controller of H M. Stationery Office.
Printed by T Buncle & Co. Ltd., Arbroath.

A Hand List of the Plants of the London Area*

COMPILED FROM THE BOTANICAL RECORDS OF THE LONDON NATURAL HISTORY SOCIETY.

Flowering Plants, Ferns and Stoneworts.

By DOUGLAS H. KENT and J. EDWARD LOUSLEY.

PREFACE.

IT is now more than fourteen years since the publication of the last part of the *Botanical Records of the London Area*, and much of that work is now out-of-print and of the remainder the stock is very short. Numerous additions have been made by our members and others, and it is therefore felt that a new account should be published without further delay.

As in the earlier publication, the London Area is defined as including all places within twenty miles of St. Paul's Cathedral, and its limits are shown by the circle on the map. In a few cases, however, such as Box Hill and Reigate Heath, the limits have been very slightly extended to include the whole of places of interest on the boundary. The country included contains a wide range of habitats, from salt-marshes by the Thames below London and water-meadows by the Thames above London to the well drained soils of the chalk. In spite of the alarming rate at which the country has been destroyed by development during the past half-century, a rich and varied flora is still to be found, as the following pages will show.

It must be emphasised that this account is not intended to be a "Flora" of the London Area, but remains, like its predecessor, primarily a statement of observations made by past and present members of the Society. In many cases these observations are only confirmations of old records, some of which are well known. In such instances they afford evidence of the continued existence of the species in the locality, in others they represent new discoveries. A few records easily available to the Editors have been added to fill in obvious gaps, but no attempt has been made to collect records from outside sources. To have done so for an area including parts of six counties, all with published Floras, would have taken years of work, filled several volumes, and defeated the main object of this publication.

Although it has been thought advisable to reproduce much of the material printed in *Botanical Records* in the following pages, this is essentially a new work, the records having been arranged according to the Watsonian vice-county system (see p. viii). Recorders, dates, and whereabouts of supporting herbarium material have also been included in order to conform with usual scientific practice.

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*Title page, contents and index sheets will be issued later.

It will be obvious that the Editors have been unable to check the identification of all the specimens on which the records are based, and this applies particularly to the aliens. Some determinations made by former authorities are now out-of-date (e.g. in *Viola*), but it seems advisable to include them. Certain varieties may not be worthy of separation on modern standards, but to exclude them would involve the unjustified risk of suppressing some which may prove to be of value.

The vexed question of nomenclature has provided some of our most serious difficulties, and we are grateful to Professors T. G. Tutin and A. R. Clapham and Dr. E. F. Warburg for permission to use the names adopted for their new *British Flora* (now in the press). For several reasons, not the least of which is the risk of publishing new combinations precociously, it has not been possible to employ their names consistently in the first part. Synonyms have been given where they seemed likely to help in reconciling this with old or new works on the British flora.

Grateful thanks are due to many helpers, and it is not possible to enumerate them all, but special mention must be made of Mrs. B. Welch and Mr. J. H. G. Peterken for assistance in transcribing the records to the new card index from which the manuscript has been prepared, to Mr. C. P. Castell for making the map, and to Messrs. J. E. S. Dallas and W. H. Spreadbury for providing the photographs.

The compilers will be glad to receive additional records, comments and suggestions.

THE HISTORY OF THE BOTANICAL RECORDS OF THE LONDON NATURAL HISTORY SOCIETY.

The City of London Entomological and Natural History Society was founded on 10th June 1858 under the title of the Haggerston Entomological Society, the first-mentioned name being adopted on 6th October 1887.

As the title suggests, the interests of the Society were mainly insects, and as far as can be traced no serious attempts were made to record plants.

The North London Natural History Society originated in January 1888 as the Clapton Field Naturalists Club. It became the Grocers Company School Natural History Society in 1891, and adopted its later name in 1892. The Botanical Section of the Research Committee was set up in 1900 with C. S. Nicholson as Secretary. Their area was divided into twelve arbitary divisions each section being given a number. A register was brought into use, the name of the species being recorded on the left hand margin of each page the remainder being ruled longitudinally into sections. The number of each district was placed at the top and a tick marked against each plant in the respective sections in which it had been found. No localities were given and the results were never published.

In January 1914 the two Societies merged to form the London Natural History Society, and a Botanical Committee was set up with

E. B. Bishop as Secretary and Recorder. During 1914-15 the area to be covered by the Society was selected, viz.—a circle with a twenty-mile radius from St. Paul's Cathedral. This was divided into twenty-four divisions—twelve north and twelve south of the Thames.

During 1917 the Society decided on the formation of sections, and on Tuesday, 15th May, the inaugural meeting of the Botanical Section was held at Salisbury House, E.C. The chair was taken by R. W. Robbins, and also present were E. B. Bishop, H. J. Burkill, L. B. Hall, C. S. Nicholson, J. Ross, E. Samuelson, E. R. Spragg, Mrs. C. S. Nicholson and Mrs. C. L. Wilde. The following officers were elected:—Chairman, R. W. Robbins. Secretary, Mrs. C. L. Wilde. Recorder for Northern Districts, C. S. Nicholson. Recorder for Southern Districts, E. B. Bishop. The original members of the Section were:—Allen, W., Bacot, A. W., Bickham, S. H., Biddiscombe, W., Bishop, E. B., Braithwaite, J O., Burkill, H. J., Capleton, A., Cooke, P. H., Cooper, B., Cox, O. F., Dallas, J. E. S., Digby, D. E., Gardner, J. E., Gaze, W. E., Grinling, C. H., Hall, L. B., Hanbury, F. J., Loney, H., Lowne, B. T., Murray, L. C., Nicholson, Miss B., Nicholson, C., Nicholson, C. S., Riches, J., Robbins, R. W., Robbins, Mrs. R. W., Ross, J., Sarvis, J., Simpson, W., Thomas, G. W., Tremayne, L. J., Tremayne, Mrs. L. J., Watson, W., Wilde, Mrs. C. L., and Wood, P. W. It is pleasing to record that at least six of these pioneers are still with us to-day.

A number of record sheets 14″×9¼″ were suitably ruled and printed. Each plant was allocated two sheets, one for northern districts the other for southern. The sheets were divided into twelve divisions and on them were entered the locality in which the plant had been found, the recorder's name, the date and the whereabouts of any voucher specimen. These record sheets were to form the basis of botanical recording for about thirty years. On the death of C. S. Nicholson in November 1918, E. B. Bishop became Recorder for the whole of the area.

At a meeting in April 1926, H. J. Burkill suggested the publication of the Society's Botanical Records in the *London Naturalist*. This scheme was approved by the Committee, and in 1927 R. W. Robbins and H. Spooner were appointed to act with the Recorder in editing the work.

The first part of *Botanical Records of the London Area* appeared in 1928 as a supplement to the *London Naturalist* for 1927 and consisted of eight pages covering genera from *Ranunculaceæ* to *Nymphaeaceæ*. E. B. Bishop resigned from the post of Recorder in 1929, and R. W. Robbins agreed to act temporarily. Seven more parts of *Botanical Records* were published as supplements to the *London Naturalist* between 1929 and 1936, the entire work finally totalling 114 pages.

In the summer of 1940 R. W. Robbins resigned the Recordership, the post being temporarily filled by G. H. Spinney until the election of J. E. Lousley in November 1942. In 1943, the late P. H. Cooke anonymously donated the sum of £30 towards the publication of a new edition of the *Botanical Records*. During October 1943 S. Austin raised the question of publishing a new edition of *Botanical Records*; it was, however, decided to postpone the matter until the war had ended. In the

London Naturalist for 1944 the Recorder commenced a series of Botanical Reports giving details of the more important records made by members during the year. These reports have since appeared annually.

At a Committee meeting in October 1945 the Recorder outlined a scheme for the revision of the records, and in March 1946, after a long discussion at a further Committee meeting, the scheme was adopted; this necessitated the divisional recording method being abandoned in favour of the Watsonian vice-county system

The boundaries of the Watsonian vice-counties were defined by H. C. Watson in 1859 (*Cybele Britannica*, 4, 139 seq.) and repeated by him in *Topographical Botany* (Ed. 1, 1, 21 seq.) in 1873, and were based on the county boundaries existing at the time. In view of the importance of maintaining continuity in scientific work, it is essential to adhere strictly to these old boundaries and no subsequent administrative alterations can be recognized. The most important change of this nature within our area was the formation in 1888-89 of the County of London, which included parts of Kent, Surrey, Essex and Middlesex.

The vice-counties, of which parts fall within the Society's Area and the old districts absorbed by them are as follows:—

Vice-county.	*Old districts.*
South of the Thames.	
16. West Kent.	20-24.
17. Surrey.	13-19.
North of the Thames.	
18. South Essex.	Parts of 8 and 9, and 10-12.
19. North Essex.	Part of 9.
20. Herts.	Parts of 2, 4, 5, 6, 7, and 8.
21. Middlesex.	3, and parts of 4, 5, 6, 7, and 8.
24. Bucks.	1, and part of 2.

Watson separated South and North Essex "by the high road from Walton and Epping to Chelmsford." By "Walton" the modern Waltham is intended.

C. P. Castell was requested to make a map of the area showing the vice-county boundaries, and the Recorder suggested a card index scheme to replace the existing large sheets used for recording. A number of cards 5″×8″ were printed, at the cost of C. L. Collenette, and were in use by the spring of 1947. In October 1947 two additional Recorders were designated, J. H. G. Peterken for Bryophytes and J. M. B. King for Fungi; the latter, however, resigned in 1948 and the post has since remained vacant.

During several Committee meetings in 1949 the problem of a new edition of *Plant Records* was discussed, until finally in 1950 it was decided to recommend to the Council that the project should go ahead and the first part appear in the next *London Naturalist*.

PLAN OF THE HAND LIST.

1. Nomenclature. The nomenclature adopted for British and naturalised alien species is based on that of the new *British Flora* by Tutin, Clapham and Warburg, while for some casual alien species that of the *British Plant List,* by G. C. Druce, Ed. 2 (1928) is used. Where necessary this has been brought up to date.

2. General Outline. The entries are arranged as follows:—

(1) The scientific name of the species, followed by synonyms where it is desirable to facilitate reference to older works.
(2) English name, where there is one in general use.
(3) In some cases the supposed status of the species is given. The expressions " Native," " Colonist," " Alien," etc., refer to the London Area and not to Britain generally. In the case of alien species, the continent, country or area of their supposed origin is given. Casual alien plants are shown in small type.
(4) Habitat and general frequency in the Area.
(5) Records arranged according to Watsonian vice-counties.
(6) Individual records, localities, dates and recorders' initials.

The following abbreviations and signs have been used:—

? after a name indicates doubt as to the correctness of identification, after a locality it indicates doubt as to the plant's existence in the locality.

; is used between different localities recorded by the same collector, and between the initials of different collectors recording the same locality.

" " is used to indicate remarks which are not those of the compilers.

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(A supplementary list will be given following the Stoneworts.)

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L.P.	Parmenter, L.
L.S.	Sabine, L.
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P.F.V.	Vernon, P. F.
P.G.	Greenfield, P.
P.H.C.	Cooke, P. H.
P.J.	Jansen, P.
P.J.H.	Hanson, P. J.
P.M.H.	Hall, P. M.
P.T.	Taylor, P.
P.W.R.	Richards, P. W.
R.A.B.	Boniface, R. A.
R.A.G.	Graham, R. A.
R.C.L.B.	Burges, R. C. L.
R.D.M.	Meikle, R. D.
R.F.Y.	Yeo, R. F.
R.H.M.	Morton, Miss R. H.
R.L.	Libbey, R.
R.L.S.	Smith, R. L.
R.M.	Melville, R.
R.M.P.	Payne, R. M.
R.P.D.	Donnelly, R. P.
R.P.S.	Smith, R. P.
R.S.R.F.	Fitter, R. S. R.
R.W.B.	Butcher, R. W.
R.W.D.	David, R. W.
R.W.H.	Hale, R. W.
R.W.R.	Robbins, R. W.
S.A.	Austin, S.
S.B.	Batko, S.
S.E.C.	Chandler, S. E.
S.H.B.	Bickham, S. H.
S.M.W.	Walters, S. M.
S.T.J.	Jermyn, S. T.
St.J.M.	Marriott, St. J.
T.A.D.	Dymes, T. A.
T.C.D.	Denston, T. C.
T.G.C.	Collett, T. G.
T.G.T.	Tutin, T. G.
V.A.	August, V.
V.H.C.	*
V.R.C.	*
V.S.S.	Summerhayes, V. S.
W.A.S.	Sledge, W. A.
W.B.	Biddlescombe, W.
W.E.G.	Gaze, W. E.
W.F.	Farenden, W.
W.H.G.	Griffin, W. H.
W.H.P.	Pearsall, W. H.
W.H.S.	Spreadbury, W. H.
W.J.L.S.	Sladen, W. J. L.
W.M.	Mackintosh, W.
W.N.L.	Lawfield, W. N.
W.R.P.	Philipson, W. R.
W.R.S.	Sherrin, W. R.
W.S.	Simpson, W.
W.W.	Watson, W. C. R.

* Despite much searching among the archives of the Society initials which are so starred remain unidentified.

† This list also contains the initials of the various specialists who have determined critical plants.

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Fl. Bucks.	*The Flora of Buckinghamshire.* By George Claridge Druce. Arbroath. 1926.
Fl. Essex.	*Flora of Essex.* By George Stacey Gibson. Lond. 1862.
Fl. Herts.	*Flora of Hertfordshire.* By the late Alfred Reginald Pryor. Ed. for the *Hertfordshire Natural History Society* by Benjamin Daydon Jackson. Lond. 1887.
Fl. Kent.	*Flora of Kent.* By Frederick Janson Hanbury and Edward Shearburn Marshall. Lond. 1899.
Fl. Middx.	*Flora of Middlesex.* By Henry Trimen and William T. Thiselton Dyer. Lond. 1869.
Fl. Surrey.	*Flora of Surrey.* By Charles Edgar Salmon. Ed. by William Harrison Pearsall. Lond. 1931.
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Lond. Nat.	*The London Naturalist: The Journal of the London Natural History Society.* Arbroath. 1921→
Tr.L.N.H.S.	*Transactions of the London Natural History Society, 1914-1920.* Lond. 1915-1921.
Watson B.E.C. Rep.	*Reports of the Watson Botanical Exchange Club.* Cambridge. 1884-1934.
Watsonia.	*Watsonia; The Journal of the Botanical Society of the British Isles.* Arbroath. 1949→

HERBARIA CITED.

Hb.B.	Herb. E. B. Bishop. Now divided between Herb. Mus. Brit. and Herb. L.N.H.S.
Hb.D.	Herb. G. C. Druce. Now at Oxford University.
Hb.E.C.M.	Herb. Epsom College Museum.
Hb.H.	Herb. L. B. Hall. Now in Herb. N. D. Simpson at Bournemouth.
Hb.K.	Herb. Kent. Private collection of D. H. Kent at Ealing.
Hb.Kew.	Herbarium of the Royal Botanical Gardens at Kew.
Hb.L.	Herb. Lousley. Private collection of J. E. Lousley at Streatham.
Hb.L.N.H.S.	Herb. London Natural History Society.
Hb.Mus.Brit.	The National collection at the British Museum (Natural History), S. Kensington.
Hb.R.	Herb. R. W. Robbins. Now in the possession of the London Natural History Society.
Hb.S.L.B.I.	Herb. South London Botanical Institute, Tulse Hill, London, S.E.
Hb.W.	Herb. Welch. Private collection of Mrs. B. Welch at Richmond.

A HAND LIST OF THE PLANTS OF THE LONDON AREA.

RANUNCULACEAE

CLEMATIS L.

C. Vitalba L. *Wild-Clematis, Traveller's Joy, Old Man's Beard.* Common on calcareous soils in v.-cc. 16, 17, 18, 20, 21 and 24, also locally common on alluvial soils, especially along the Thames in v.-cc. 17 and 21. Scattered records from all over the area on other soils. The var. integrata DC. is often found where the typical species (var. lobata Corb.) occurs in quantity. The var. Timbali Drabble, previously known only from the Isle of Wight—see *J. Bot.*, *70*, 83 (1932), is reported from v.-c. 17. Near Underhill Farm, Buckland, 1950, *B.M.C.M. & J.E.L.; Hb.L.*

C. Viticella L. Alien. S. Europe. Very rare. V.-c. 21. Scratch Wood, Edgwarebury, 1947, *L.J.J.*; *Hb.K.*

THALICTRUM L.

T. flavum L. *Common Meadow Rue.* Streamsides, ditches and marshes. Local. V.-c. 16. Barnes Cray, 1944; Dartford Heath, 1946; *F.R.* Darenth, 1949; *H.M.P.* teste *F.R.* Sutton-at-Hone, 1950; *H.M.P.* V.-c. 17. Scattered localities by the Thames from Weybridge to Ham. Several plants by the Thames between Hammersmith and Mortlake, 1945; *R.A.B.* V.-c. 18. River Roding, near Ilford, 1912; *R.W.R.*; *Hb.R.* Bank of Ching near Whitehall Bridge, Chingford, 1929; *B.T.W.* V.-c. 20. By the Lea near Broxbourne; *P.H.C.* Cheshunt Marsh, 1919; *L.J.T.* Scattered localities by the Colne between Springwell and Rickmansworth. Ditch near West Hyde, 1950; *D.H.K.* V.-c. 21. Several localities by the Thames between Staines and Hampton Wick. Scattered along the Colne Valley from Staines to Springwell. Near Northwood, 1902; *C.B.G.* In River Lea near Ponders End; *C.N.* V.-c. 24. Horton, 1903; *C.S.N.* Colnbrook, 1903; *C.B.G.* Wraysbury, 1912, *P.H.C.*; *Hb.L.N.H.S.* Near Harefield, 1920; *J.E.C.* Denham, 1950; *D.H.K.*

T. minus L. *Lesser Meadow Rue.* Alien. Garden escape. Naturalised on road banks and in grassy places. Rare. V.-c. 17. Among wood-stacks near Teddington Lock, 1946; *B.W.* V.-c 21. West Heath, Hampstead, several plants, 1948; *H.C.H.*; 1949; *D.H.K.* V.-c. 24. Several well-established patches by the roadside near Iver Heath, 1950; *L.N.H.S. Excursion.*

ANEMONE L.

A. NEMOROSA L. *Wood Anemone, Wind-flower.* Woods and heaths. Locally plentiful. V.-cc. 16, 17 and 18. Generally distributed. V.-cc. 19 and 20. Apparently less common. V.-c. 21. Locally abundant in woods in the north-west parts of the county, rare elsewhere. V.-c. 24. Denham; *D.H.K.* The var. PURPUREA DC. is possibly common, and the var. APETALA E. J. Salisbury has been recorded from v.-c. 17. Near Ashtead, 1944, *W.H.S.*; *Hb.L.* See *Lond. Nat.*, *24*, 12 (1945) and *B.E.C. 1943-44 Rep.*, 698 (1946).

A. APENNINA L. *Blue Mountain Anemone.* Alien. S. Europe. Naturalised in copses. Very local. V.-c. 17. Near Gladstone Convalescent Homes, Mitcham, 1918, *J.E.W.*; small copse between Mitcham and Sutton, 1935, *J.E.L.*; *Hb.L.* Ravensbury, Mitcham, *P.H.C.*; *Hb.L.N.H.S.* The plant was first recorded from the Mitcham area in *J. Bot.*, *2*, 78 (1864). There appear to have been several localities quite close together and now almost entirely built over.

ADONIS L.

A. ANNUA L., A. AUTUMNALIS L. *Pheasant's Eye.* Cornfields. Very rare. V.-c. 16. Near Darenth Wood, 1951; *H.M.P.* V.-c. 20. Great Amwell, 1936, *D.McC.*; *Hb.L.N.H.S.* See *Lond. Nat.*, *18*, 31 (1939).

MYOSURUS L.

M. MINIMUS L. *Mouse-tail.* Cornfields, ditches and arable ground on heavy soils. Very local. V.-c. 17. Chertsey Mead, 1920, *C.L.W.*; *Hb.B.* Cornfield near Buckland, 1935, *J.E.L. & E.C.W.*; cornfield near Claygate railway station, 1936, *J.E.L.*; *Hb.L.* N.E. of Redhill railway station, 1950, *B.M.C.M.* V.-c. 21. Near Potters Bar, 1914; *J.E.C.*; *Hb.Mus.Brit.* V.-c. 24. Rush Green, near Uxbridge, 1916, *A.B.J.*; *Hb.S.L.B.I.* Denham, 1934, *H.J.J.*; *Lond. Nat.*, *14*, 75 (1935); *P.H.C.*; *Hb.L.N.H.S.*; 1935; *J.E.S.D.*

RANUNCULUS L.

The late W. H. Pearsall identified a number of specimens in the Batrachian section, and Dr. R. W. Butcher has also kindly examined many gatherings. The section is, however, under revision and some of the plants given here as species are likely to be reduced in rank.

R. FLUITANS Lam. Rivers and streams. Locally abundant. V.-c. 17. River Wandle, Watermeads, Mitcham, 1925, *J.E.L.*; *Hb.L.* Paper Mill, Esher, 1942; Church Cobham, 1942; Leatherhead, 1942, all from the River Mole, *A.E.E.* *Hb.E.C.M.* The Leatherhead plant had numerous petals and hairy receptacles and was det. by *R.W.B.* V.-c. 20. Broxbourne; *P.H.C.* Near Dob's Weir, in the Lea, 1909; *V.R.C.* V.-c. 21. Plentiful in the Colne from Colnbrook to Staines. Specimens from Staines Moor, 1946, *D.H.K.*; *Hb.K.* were det. by *R.W.B.* River Cran at Isleworth, 1905; *C.B.G.*; 1916, *A.B.J.*; *Hb.Mus.Brit.*

Cran at Hounslow Heath, abundant, 1948, *D.H.K.*; *Hb.K.* confirmed by *R.W.B.* Longford River, Stanwell, abundant, 1950; *D.H.K.* V.-c. 24. Colne at Colnbrook, 1949; *D.H.K.*

R. CIRCINATUS Sibth. Ponds and ditches. Local. V.-c. 16. Dartford Marshes, 1931; *P.H.C.* V.-c. 17. The Moat, Kew Gardens, 1924, *D.G.C.*; *Hb.L.*; seen there at intervals; *J.E.L.* V.-c. 21. Harefield; Moor Hall, 1907; Staines Moor, 1904; *C.B.G.*; 1946; *D.H.K.* Hampton Court Park, 1931; *R.W.R.*; still abundant in Long Water, 1950; Bushey Park, 1946; Shortwood Common, Staines, abundant, *D.H.K.*; *Hb.K.* Colnbrook; near Denham, 1946; *D.H.K.* Bedfont gravel-pits; *A.W.W.*

R. TRICHOPHYLLUS Chaix. Ponds and ditches. Local. V.-c. 16. Pond in Westerham Wood; *D.McC. & F.R.* V.-c. 17. Bookham Common, 1925, *E.B.B.*; *Hb.B.* det. *W.H.P.*; 1935, *D.H.K.*; *Hb.K.* det. *R.W.B.* Mitcham Common, 1925, *J.E.L.*; *Hb.L.*; 1942; Hook, 1942, *A.E.E.*; *Hb.E.C.M.* det. *R.W.B.* V.-c. 21. Harefield, 1941; Hampton Court Park, 1942; *D.H.K.* Shortwood Common; Staines Moor; gravel-pit west of Hounslow Heath, 1947, *D.H.K.*; *Hb.K.*, conf. by *R.W.B.*

R. DROUETII F. Schultz. Ponds and ditches. Local. V.-c. 16. Near Brasted, 1935; *M.H.H.* V.-c. 17. Pond near Titsey, 1923; *R.W.R.* Mitcham Common, 1924; below Arthur's Seat, Caterham, 1925, *J.E.L.*; *Hb.L.* V.-c. 21. Pond between Acton and Twyford, 1909; *C.B.G.* Now built over; *D.H.K.* West Drayton; *P.H.C.*; 1941; *D.H.K.* Hampton Court Park; *H.W.P.* Shortwood Common; Staines Moor. 1946; Hadley Green, 1949; *D.H.K.*

R. HETEROPHYLLUS Weber. Ponds. Rare. V.-c. 16. Pool in Darrack Wood, Orpington, 1920; *W.W.* Westerham Wood, 1947; *D.McC. & F.R.* V.-c. 17. Mitcham Common, 1941, *P.H.C.*; *Hb.L.N.H.S.* conf. by *R.W.B.*

forma TRIPHYLLUS (Hiern). V.-c. 16. Swanscombe Marshes, 1919; *P.H.C.* "Probably this"; *W.H.P.* V.-c. 17. Near Limpsfield, 1925, *E.B.B.*; *Hb.B.* "Approaching this"; *W.H.P.* Pond in field between Oxshott and Stoke D'Abernon, 1926, *E.C.W.* det. *W.H.P.*; Mitcham Common, 1927, *J.E.L.*; *Hb.L.* See *B.E.C. 1927 Rep.*, 561 (1928). V.-c. 18. Roadside ford, Abridge, 1930, *J.E.L.*; *Hb.L.* See *Watson B.E.C. 1930-31 Rep.*, 56.

var. SUBMERSUS (Godr.) Bab. V.-c. 17. Near Raynes Park, 1928; Mitcham Common, 1925, *J.E.L.*; *Hb.L.* det. *W.H.P.*; 1942, *A.E.E.*; *Hb.E.C.M.* det. *R.W.B.*

var. RADIANS (Revel) forma GODRONII (Gren.). V.-c. 16. Dunton Green brickyard, 1927, *D.G.C.*; *Hb.L.* det. *W.H.P.* V.-c. 17. Limpsfield, 1924, *R.W.R.*; *Hb.R.* det. W.H.P. Mitcham Common, 1925, *J.E.L.*; *Hb.L.* det. *W.H.P.*

R. **pseudo-fluitans** auct. angl. p.p. Rivers and streams. Locally abundant. V.-c. 16. Abundant in the Darent from above Eynsford to Darenth *F.R.* det. **R.W.B.* V.-c. 17. Hogsmill Stream, Ewell, 1942, *A.E.E.*; *Hb.E.C.M.* det. **R.W.B.* V.-c. 20. River Colne from Watford to Springwell; *D.H.K.* V.-c. 21. Frequent in the Colne from Springwell to Colnbrook; *D.H.K.* Specimens from Harefield, Denham and Uxbridge Moor, *D.H.K.*; *Hb.K.* have been det. by **R.W.B.* Frays River, Cowley, 1948; *D.H.K.*; *Hb.K.* det. **R.W.B.* V.-c. 24. Colne at Denham, and near Colnbrook; *D.H.K.*

**The plants determined by Dr. Butcher are given a name which we are unable to use because it has not been published. It has reference to the high Calcium carbonate content of the streams in which it grows.*

R. **peltatus** Schrank. Ponds and streams. Common and widely distributed throughout the area.

var. **floribundus** (Bab.). V.-c. 16. Hayes Common; *W.W.* V.-c. 17. Chart, Limpsfield, 1933, *P.H.C.*; *Hb.L.N.H.S.* conf. by *R.W.B.* East of Limpsfield Common; *W.W.* V.-c. 18. Chingford, 1934; *P.H.C.* V.-c. 21. Crouch End, *C.S.N.*; *Hb.L.N.H.S.* conf. by *R.W.B.* Near Brentford, 1933; *D.H.K.* Harefield, 1944; Shortwood Common, 1947, *D.H.K.*; *Hb.K.* det. *R.W.B.*

forma **crenatus** Glueck. V.-c. 21. Hendon, 1909, *P.H.C.*; *Hb.L.N.H.S.* det. *R.W.B.* Near Harefield, 1945, *D.H.K.*; *Hb.K.* det *R.W.B.*

forma **truncatus** (Koch). V.-c. 17. Bookham Common, 1940 *D.H.K.*; *Hb.K.* det. *R.W.B.* V.-c. 18. Chigwell Row, 1916, *E.B.B.*; *Hb.Mus.Brit.* V.-c. 21. Laleham, 1941, *P.H.C.*; *Hb.L.N.H.S.* det. *R.W.B.*

R. **sphaerospermus** Boiss. & Blanche. Streams. Very local. V.-c. 16. Above Brasted, 1924, *R.W.R.*; *Hb.R. & L.N.H.S.* det. *W.H.P.* Stream near Brasted Church, 1935; *R.W.R.*

R. **Baudotii** Godr. Brackish ditches. Rare. V.-c. 16. Near Crayford Ness, 1951; *J.E.L., B.W. & J.C.C.*

R. **Lenormandi** F. Schultz. Muddy pond verges and ditches. Very rare. V.-c. 16. Hayes, 1936-37; *D.McC.* det. *Kew.* See *Lond. Nat.*, *18*, 31 (1939). Destroyed, 1938; *D.McC.* V.-c. 17. West End Common, Esher, 1935, *J.E.L.*; *Hb.L.*; 1942, *A.E.E.*; *Hb.E.C.M.*

R. **hederaceus** L. *Ivy-leaved Crowfoot.* Muddy pond verges and ditches. Not common. V.-c. 16. Keston Ponds, 1917; *P.H.C.*; 1948; *F.R.* Chislehurst; *W.W.* Joyden's Wood, 1938; *P.H.C.* V.-c. 17. Abrook; *W.W.* Oxshott Heath, 1925; *E.B.B.* Richmond Park, 1919; *L.J.T.*; 1924, *E.B.B.*; *Hb.B.*; 1950, frequent; *B.W.* Mitcham Common, 1931, *J.E.L.*; *Hb.L.* det. *W.H.P.*; 1938; *P.H.C.* Botley Hill, Titsey, 1931; *R.W.R.* West End Common, Esher, 1935, *J.E.L.*; *Hb.L.* V.-c. 18. Walthamstow, 1900, *R.W.R.*; *Hb.L.N.H.S.* Chingford; Cook's

Folly Wood; *P.H.C.* V.-c. 20. Totteridge Green; *E.M.D.* Hadley Wood, 1908; *C.B.G.*; 1945; *D.H.K.* Broxbourne, 1909; *P.H.C.* V.-c. 21. West Drayton, 1900; *C.B.G.* Northwood Green, 1928; *B.T.W.* Harefield, 1942; Hounslow Heath, 1944; Hadley Common, 1946; *D.H.K.*

R. sceleratus L. *Celery-leaved Crowfoot.* Marshes, brackish ditches, stream and pond sides. Frequent and widely distributed in all the v.-cc.

R. Flammula L. *Lesser Spearwort.* Wet heathy places, pond sides and ditches. Widely distributed and rather common in all the v.-cc.

R. Lingua L. *Greater Spearwort.* Pond sides. Rare. This fine water plant is commonly cultivated in suitable gardens and parks and, although undoubtedly native elsewhere (e.g. the East Anglian Fens), it is impossible to be certain that it is native in any of our stations. V.-c. 16. Near Locks Bottom, Farnborough; *B.T.L.* Seen by *E.B.B.* Bickley; *W.W.* V.-c. 17. Headley Heath, 1949; *R.W.D.* V.-c. 18. Baldwin's Hill, Loughton, 1948; *L.N.H.S. Excursion.* See *Lond. Nat.*, *28*, 29 (1949). V.-c. 20. Totteridge Green, 1901, *J.E.C.*; 1910; *C.S.N.*; 1930, 1942, *J.E.L.*; *Hb.L.*; 1949; *D.H.K.* V.-c. 21. Pond near Stanmore Common, 1946, *D.H.K.*; *Hb.K.* Lake, Syon Park, abundant, but doubtless introduced, 1947; *L.G.P. & R.M.P.*; 1948, *D.H.K.*; *Hb.K.* Lake, Grimsdyke, Harrow Weald, 1947; *B.W. & D.H.K.* No doubt an introduction.

R. auricomus L. *Goldilocks, Wood Buttercup.* Woods and shady places. Frequent and well distributed in v.-cc. 16, 17, 18, 20, 21 and 24. V.-c. 19. Epping Lower Forest, 1900, *C.S.N.*; *Hb.L.N.H.S.* Roydon, 1908; *P.H.C.*

R. acris L. *Upright Meadow Buttercup.* Abundantly distributed throughout the area. No attempt has been made to work out the segregates of this species.

R. repens L. *Creeping Buttercup.* Abundant and widely distributed all over the area. A very large glabrous plant found along the banks of the tidal Thames in v.-cc. 17 and 21 may be var. glabratus DC.

R. bulbosus L. *Bulbous Buttercup.* Fields and grassy places. Common and well distributed in all the v.-cc.

R. sardous Crantz. *Pale Hairy Buttercup.* Brackish pastures. Locally common in Kent, elsewhere rare in fields and waste ground on clay. V.-c. 16. Near Northfleet, 1919, *P.H.C.*; *Hb.B.* Dartford Marshes, 1931; *P.H.C.* Stone Marshes, 1945; *F.R.* V.-c. 17. Field near Warlingham, 1925, *J.E.L.*; *Hb.L.* V.-c. 20. Near St Albans, 1909, *P.H.C.*; *Hb.L.N.H.S.* High Barnet, 1919; *J.E.C.* V.-c. 21. Near Dew's Farm, Harefield, 1910, *C.B.G.*; *Hb.Kew.* Uxbridge, 1910, *J.E.C.*; *Hb.Mus.Brit.* Moor Lock, Harefield, 1918; Hackney Marshes, 1921; *J.E.C.*

R. PARVIFLORUS L. *Small-flowered Crowfoot.* Dry banks and bare waste places. Very rare. V.-c. 17. Near Lacey Green, Coulsdon, 1929, *J.E.L.*; *Hb.L.*

R. ARVENSIS L. *Corn Crowfoot, Hedgehogs.* Cornfields and waste places. Formerly common in cornfields but now, owing to modern grain-sifting methods, quite rare; many of the recent records are as a casual. V.-c. 16. Eltham; W. of Eynsford, 1920; *W.W.* Near Brasted, 1935; *M.H.H.* V.-c. 17. Numerous old records. Oxted, 1936; *P.H.C.* Persistent in arable fields on Gault about Buckland; *J.E.L.* V.-c. 18. Many old records but no modern. V.-c. 19. Roydon; *P.H.C.* V.-c. 20. A number of old records but no modern ones. V.-c. 21. Several early records. Perivale, 1938; *D.H.K.* Canal path, Brentford, a solitary plant, 1945, *B.W.*; *Hb.L.* Cowley Peachey, one plant, 1946; rubbish tip, Hanwell, about twelve plants, 1949, *D.H.K.*; *Hb.K.* V.-c. 24. A few old records. Denham to Chalfont, 1930; *P.H.C.*

R. FICARIA L. *Lesser Celandine, Pile Wort.* Shady places. Common and well distributed all over the area. The var. INCUMBENS F. Schultz has been recorded from v.-c. 21. Hanwell, 1935; *D.H.K.* and var. BULBIFERA Albert from v.-c. 21. Old Park Wood, Harefield, 1948; *D.H.K.*

CALTHA L.

C. PALUSTRIS L. *Marsh Marigold, King Cup.* Marshes, stream sides and wet woods. Rather common and well distributed in all v.-cc. except 19, where it has not yet been recorded. The var. GUERANGERII (Bor.) Lam. is recorded from v.-c. 17. Marsh near Oxted Mill, 1923; *R.W.R.*

HELLEBORUS L.

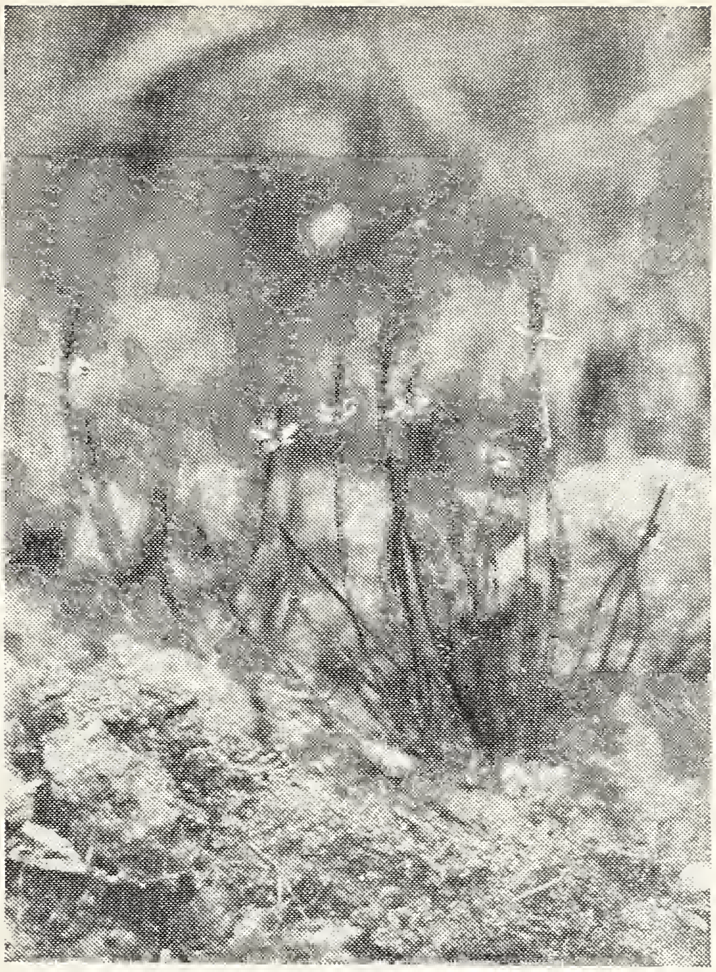
H. VIRIDIS L. var. OCCIDENTALIS Rouy. & Fouc. *Green Hellebore.* Woods. Rare. V.-c. 16. Near Downe; E. of Eynsford; *W.W.* Wood W. of Shoreham, 1947; *Miss Burnaby-Atkins* teste *F.R.* Westerham Wood; *J.F.* teste *F.R.* V.-c. 17. S. of Croydon, 1922; *J.E.S.D.* Oxted; copse on summit of downs near Woldingham, 1924; *R.W.R.*; *Hb.B.* Near Chelsham, 1926, *J.E.L.*; *Hb.L.* V.-c. 20. Broxbourne 1898 *F.E.M.*; *Hb.L.N.H.S.*

H. FOETIDUS L. *Stinking Hellebore.* Woods and thickets. Very local. V.-c. 17. Headley Lane, foot of Juniper Hill, 1926; *L.J.T.*; *Hb.L.* Still there in 1942, but reduced in quantity; *J.E.L.* Still there in 1949; *L.N.H.S. Excursion.*

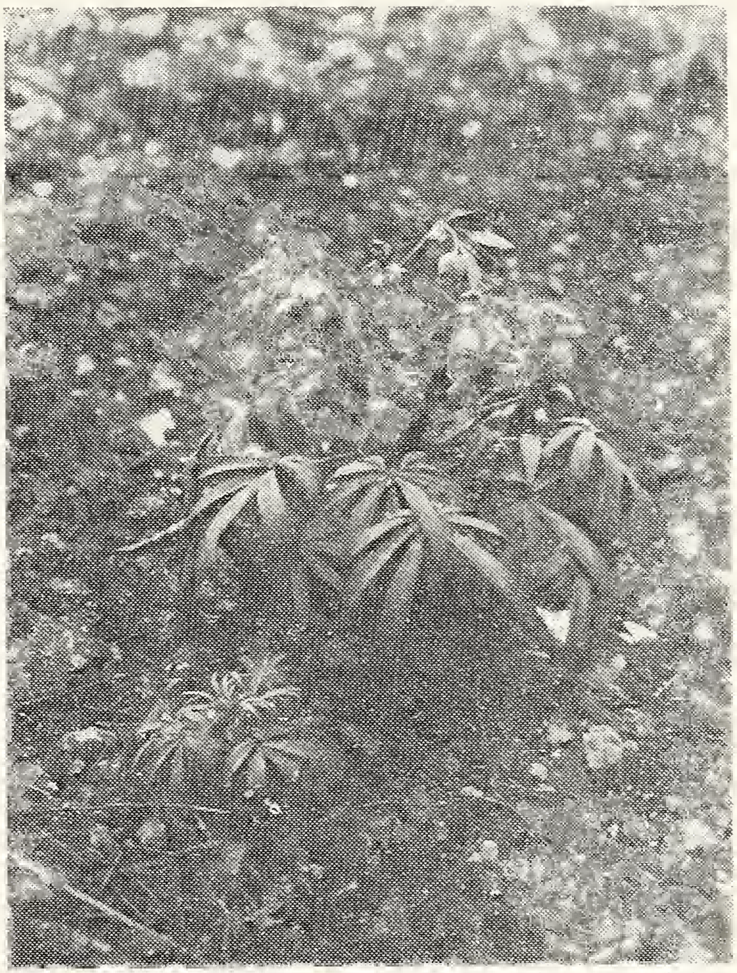
ERANTHIS Salisb.

E. HYEMALIS (L.) Salisb. *Winter Aconite.* Alien. S. Europe. Naturalised in copses and plantations. Local. V.-c 16. Darenth Grange, 1950; *H.M.P.* V.-c. 17. Plantation, Mitcham, 1927, 1937, 1938, *J.E.L.*; *Hb.L.* Wood near Leigh Mill, Godstone, 1929, *R.W.R.*; *Hb.R.* Between Banstead and Woodcote, 1932; *P.H.C.* V.-c. 20.

PLATE I.



Mouse-tail (*Myosurus minimus* L.). Denham, Bucks., 1935.
J. E. S. Dallas



Stinking Hellebore (*Helleborus foetidus* L.). Mickleham, Surrey.
W. H. Spreadbury.

PLATE II.

Columbine (*Aquilegia vulgaris* L.). Selsdon Wood, Surrey, c. 1920.
J. E. S. Dallas.

Marsh Violet (*Viola palustris* L.). West End Common, Esher, Surrey.
W. H. Spreadbury.

Plentiful in a small wood near Hertingfordbury (Roxford Copse), 1939; *R.S.R.F.*; 1950; *L.N.H.S. Excursion.* V.-c. 21. Laleham Park, 1946; *B.W*:; 1950; *D.H.K.* Syon Park, 1946; *D.H.K.* Abundant and naturalised in Whitchurch Churchyard, c. 1942; *H.W.Pa.*

AQUILEGIA L.

A. VULGARIS L. *Columbine.* Woods, thickets and rough pastures. Rare and decreasing as a native. V.-c. 16. West Wickham, 1904; *P.H.C.* Near Shoreham; *W.W.* Jewells Wood; *A.G.D.* teste *F.R.* Farningham Wood, 1950; *F.R.* V.-c. 17. Margery Wood, near Walton Heath. 1917; rubbish-heap, Limpsfield Chart, 1917, garden escape; *E.B.B.* Limpsfield Common, rare, *R.W.R.*; *Lond. Nat.*, *19*, 25 (1940). Selsdon Wood, c. 1920; *J.E.S.D.*; 1928; railway bank, Woldingham, 1931; *R.W.R.* Near Farleigh, 1923, 1924, *J.E.L.*; *Hb.L.* Reigate Heath, probably planted, 1950; *B.M.C.M.* V.-c. 20. Wormley West End, 1901; *F.E.M.* V.-c. 21. Meadow near Ruislip Common, possibly native, 1947, *S.B. & D.H.K.* Near Ashford County Hospital, outcast; *J.K.H.* Waste land, Ealing, garden escape, 1946; *F.P.D.B.* Bombed sites, Cripplegate, *F.E.W.*; *Lond. Nat.*, *29*, 86 (1950).

NIGELLA L.

N. ARVENSIS L. Alien. Europe. V.-c. 21. Crouch End, 1901; *J.E.C.*

DELPHINIUM L.

There has been much confusion in the past over the names and determinations of the species of Delphinium found in Britain. In view of this it has been necessary to omit many of the records as it is not now possible to decide to which species they refer. In order to assist recorders a brief description of the plants is given.

D. AJACIS L. sec. Gay, D. GAYANUM Wilmott. *Stem erect, branched: leaves multifid; segments linear; follicles pubescent. Flowers dull, china-blue or pink.* Alien. Europe. Formerly not uncommon in cornfields, now rare. V.-c. 17. By Walton Bridge, 1935, *A.H.C.*; *Hb.L.* V.-c. 20. Rickmansworth, 1912, *P.H.C.*; *Hb.L.N.H.S.*

D. ORIENTALE Gay, D. AJACIS L. sec. Wilmott. *Raceme denser; follicles downy. Flowers vivid, bright purple to violet or bright rose; spur shorter than in former species.* Garden escape. Tips, waste places, etc. V.-c. 17. Ham Tip; Wimbledon Common; *B.W.* Rubbish-tip, Kingswood, 1950; *B.M.C.M.* V.-c. 21. Waste ground, Willesden Green, 1950; *D.H.K.*

A third species, D. CONSOLIDA L. auct., a native of the Mediterranean Region has occurred in Britain as a rare adventive, but there appear to be no authentic records from the London Area. The plant is distinguished by *its slender stem, and spreading branches: few flowered short spike, entire bracts, and glabrous follicles. The flowers are deep-blue, and the spur is long.*

BERBERIDACEAE

BERBERIS L.

B. VULGARIS L. *Barberry.* Hedges. Possibly native in some localities, but sometimes planted. Not common. V.-c. 16. Pauls Cray, Bromley and Hayes Commons; *W.W.* Farnborough, 1936; Farnborough to Chelsfield, 1937; *P.H.C.* Holwood; *D.McC.* V.-c. 17. In several places by the Thames between Richmond and Kingston. Reigate, 1919; between Reigate and Redhill, 1926; *L.J.T.* Reigate Heath, 1950; *B.M.C.M.* Leatherhead Downs, near Cherkley, 1925; *E.B.B.* Epsom Common, 1930; near Ashtead, c. 1930; Colley Hill, 1926, *J.E.L.; Hb.L*; 1941, 1942; *J.E.L.* Limpsfield Common, *R.W.R.*; *Lond. Nat.*, *18*, 64 (1939). V.-c. 18. Loughton, 1934; *B.T.W.* Whitehall Plain, Epping Forest, 1935; *J.R.* Fairmead Bottom; *P.H.C.* V.-c. 20. Near Goffs Oak, 1926; *L.J.T.* V.-c. 21. Edgware, 1904; Lower Halliford, 1905, *C.B.G.*; *Hb.S.L.B.I.* Hendon; Northwood; *P.H.C.* Near Frith Grange, Finchley, 1891; *C.S.N.* Syon Park, planted?; *D.H.K.* Near Mill Hill, 1946; *J.E.L. & D.H.K.* Enfield, 1949, *L.J.J.*; *Hb.K.* V.-c. 24. Between Denham and Uxbridge, 1938; *D.H.K.*

MAHONIA Nutt.

M. AQUIFOLIUM (Pursh.) Nutt. Alien. N. America. Naturalised in woods and plantations. Local. V.-c. 17. Cobham, 1925; *E.B.B.* Copses, Gatton, 1926, *J.E.L.*; *Hb.L.* Limpsfield, *R.W.R.; Lond. Nat.*, *18*, 64 (1939). V.-c. 18. Between Chigwell Lane and Theydon, 1938; *P.H.C.* V.-c. 21. Between Uxbridge and Harefield, 1901, *C.B.G.*; *Hb.S.L.B.I.* Laleham Park, 1946; *B.W.*; 1950; *D.H.K.* Near Denham, 1945; *D.H.K.* Roadside, Hounslow, 1950; *H.B.* V.-c. 24 Denham, 1945; wood between Black Park and Denham; roadbank, Black Park, 1950; *D.H.K.*

NYMPHAEACEAE

NUPHAR Smith.

N. LUTEA (L.) Smith. *Yellow Water Lily, Brandy Bottle.* Ponds, streams and canals. Frequent and widely distributed throughout the area wherever suitable habitats occur, though almost absent from the chalk districts.

NYMPHAEA L.

N. ALBA L. *White Water Lily.* Ponds. Local. V.-c. 16. Keston Ponds, 1925; *L.J.T.* V.-c. 17. Esher, 1918; *L.J.T.* Ham to Richmond, 1934; Epsom Stew Pond, 1935; Leatherhead Mill Pond, 1940; *P.H.C.* Burgh Heath, 1950; *B.W.* V.-c. 18. Highams Park Lake, probably introduced; *J.O.B.* Cuckoo Pits, Epping Forest, 1939; *J.H.G.P.* V.-c. 20. Totteridge Green; Totteridge Park; *C.S.N.* Aldenham; *P.H.C.* V.-c. 21. West Drayton; *P.H.C.* Hendon, 1912, *P.H.C.; Hb.L.N.H.S.* Hampton Court, 1928; *L.J.T.*; still abundant in Long Water and the Canal, 1950; *D.H.K.* Swakeleys Lake, Ickenham, 1926; *L.J.T.* Stanmore Common; Grimsdyke, Harrow Weald; Harrow Park Lake; Syon Park; Shortwood Common; Ken Wood; doubtless an introduction in some of these places; *D.H.K.* V.-c. 24. Black Park, 1899; *A.W.B.*; 1950; *D.H.K.*

PAPAVERACEAE

PAPAVER L.

P. SOMNIFERUM L. *Opium Poppy.* Alien. S. Europe. Cornfields, waste places and rubbish tips. Recorded as a colonist, casual introduction or a garden escape from all v.-cc. except 19. In Surrey (v.-c.

17) it has been known as a colonist in cornfields on the chalk, particularly in the Leatherhead-Box Hill-Epsom district, for over a century. From 1918 to 1939 it became uncommon even here owing to many of the fields going out of cultivation, but when they were ploughed again early in the war the Opium Poppy at once reappeared. In 1941 *J.E.L.* recorded it from fields near Fetcham Downs and Headley Lane which had recently been ploughed and shortly after it again became frequent. The var. HISPIDUM H. C. Watson is recorded from v.-c. 16. Keston, 1903, *W.H.G.*; *Hb.L.*

P. RHOEAS L. *Common Poppy.* Cornfields and waste places. Common throughout the area. The var. PRYORII Druce is recorded from v.-c. 16. West Wickham, 1918; *L.J.T.* Near Shoreham Church, 1924; *E.B.B.* V.-c. 17. Near Betchworth Railway station, 1923; *E.B.B.* Epsom College. 1939, *A.E.E.*; *B.E.C. 1939-40 Rep.*, 266 (1942). V.-c. 21. Harefield, 1908; *A.B.J.* The var. CAUDATIFOLIUM (Timb.) Fedde has been found in v.-c. 16. Near Green Street Green, Orpington, 1930, *J.E.L.*; *Hb.L.* det. *C.E.B.*

P. DUBIUM L. *Long Smooth-headed Poppy.* Wall tops, and cultivated and waste ground on light soils. Locally common. V.-c. 16. Holwood Park; *W.W.* Dartford; Brasted to Chevening, 1930; Stone Marshes, 1931; Abbey Wood, 1936; *P.H.C.* Near Otford railway station, 1915; *E.B.B.* Greenhithe, 1930; Romney Street, Otford, 1934; *R.W.R.* V.-c. 17. Weybridge, 1922; *R.W.R.* Walton to Cobham, 1930; Ham to Richmond, 1934; The Rookery by Streatham Common, 1935; *P.H.C.* Waste ground, Richmond railway station, 1942; *B.W.* Mickleham; *E.B.B.* Woldingham, 1917; Limpsfield, 1922, local; *R.W.R.* Chipstead, 1937; Banstead Common, 1938; *P.H.C.* V.-c. 18. Near Hale End, one plant, 1902; *R.W.R.* Stifford, 1909; Ongar; *P.H.C.* V.-c. 20. Broxbourne; *C.S.N.* Essendon, 1920; near Barnet; *P.H.C.* Mill End; Springwell; Rickmansworth, 1950; *D.H.K.* V.-c. 21. Frequent on the chalk at Harefield and Springwell; common about Uxbridge and Denham Lock; abundant by the Thames from Staines to Hampton Court; sporadically about Brentford, Hanwell and Southall; *D.H.K.* Highgate Golf Links, a single plant, 1915; *C.H.A.* V.-c. 24. Iver; *P.H.C.* Denham; Horton; Colnbrook, 1950; *D.H.K.*

P. ARGEMONE L. *Long Rough-headed Poppy.* Cultivated and waste ground on light soils. Local. V.-c. 16. Eltham; near Orpington; Darenth; *W.W.* Southfleet; *P.H.C.* V.-c. 17. Weybridge, 1922; *W.W.* Mickleham, 1919; *E.B.B.* Oxted, 1930; Ewell, 1941; near Leatherhead, 1941; *P.H.C.* Limpsfield, garden weed, 1917; *R.W.R.* Chelsea and Lambeth Reservoirs, Walton Road, 1946; *W.J.L.S.* By Kemp's Farm, Buckland, 1950; *B.W.* Betchworth railway station, 1950; *B.M.C.M.* V.-c. 18. Chadwell, 1908; Stifford, 1909; *P.H.C.* V.-c. 20. Sarratt, 1908; *P.H.C.* Broxbourne; *C.S.N.* Near Chorley Wood, 1912, *P.H.C.*; *Hb.L.N.H.S.* V.-c. 21. Harefield, 1906, *C.B.G.*;

Hb.S.L.B.I. S. of Harefield, 1922; *L.J.T.;* 1930; *P.H.C.* St Margarets, 1908; *P.H.C.* Near Staines, 1938; *D.H.K.* Ken Wood, a solitary specimen in a stubble field, 1949; *B.W., H.C.H. & D.H.K.* V.-c. 24. Near Langley, 1905; *L.B.H.*

P. HYBRIDUM L. *Round Rough-headed Poppy.* Cultivated and waste ground on light soils. Very rare. V.-c. 16. Sutton at Hone; *W.W.* V.-c. 17. Ashtead, 1929, *E.C.W.*; *Hb.L.* Mr. Wallace showed me the plant growing here a few years later; *J.E.L.* V.-c. 18. Grays, 1909; *P.H.C.* V.-c. 19. 'Fish and Eels,' Roydon, 1907; *P.H.C.* V.-c. 20. Park Street, St Albans, 1905; *P.H.C.* V.-c. 21. Harefield, 1907; *C.B.G.*

P. LATERITIUM C. Koch. Alien. Armenia. V.-c. 17. A garden weed in Oxted and Limpsfield; wall by Limpsfield Church, 1931, *R.W.R.*; *Hb.R.* det. *Kew.* In the district for many years; *R.W.R.* See *B.E.C. 1934 Rep.*, 960 (1935).

P. ATLANTICUM (Ball) Cosson. Alien. Atlas Mountains, North Africa. V.-c. 17. Established on a lane bank, Godstone, 1949, *D.McC.*; *Watsonia I*, 244 (1950). V.-c. 21. Abundant on rubble near St Giles, Cripplegate, E.C., 1947; *J.E.L.*; *Hb.L.* Plentifully on rubble in the vicinity of Gresham Street and Aldermanbury, E.C., 1946, *J.E.L.*; *Lond. Nat.*, *27*, 42 (1948). During the summer (of 1947) it increased considerably and by the autumn it was plentiful on debris over an area of about ¼ square mile about Wood Street and London Wall, *J.E.L.*; *Watsonia I*, 117 (1949).

MECONOPSIS Vig.

M. CAMBRICA (L.) Vig. *Yellow Welsh Poppy.* Alien. Garden outcast. V.-c. 21. Semi-naturalised on Stanmore Common, 1947, *D.H.K.*; *Hb.K.*; 1948; *D.H.K.*

GLAUCIUM Mill.

G. FLAVUM Crantz. *Yellow Horned Poppy.* Salt marshes. Very rare. V.-c. 16. Swanscombe Marshes, 1945; *J.E.L.* Chalkpit, Swanscombe, 1951; *H.M.P.* V.-c. 18. Rubbish-tip, East Ham, 1951; *J.E.L., B.W. & J.Ru.* V.-c. 21. Rubbish-tip, Hanwell, one plant, probably introduced with shingle ballast, 1946; *D.H.K.*

ROEMERIA Med.

R. HYBRIDA (L.) DC. Alien. Europe. V.-c. 21. Near Potters Bar, 1912, *J.E.C.*; *Hb.Mus.Brit.*

CHELIDONIUM L.

C. MAJUS L. *Greater Celandine.* Hedgebanks, waste places and wall tops. Rather common and well distributed in all the v.-cc. except 19, where it has not been recorded. A plant with double flowers is recorded from v.-c. 17. Near Cobham, 1927; *L.J.T.* Barnes Common, 1948; *L.N.H.S. Excursion.*

ESCHSCHOLTZIA Cham.

E. DOUGLASII (Hook. & Arn.) Walp. *Californian Poppy.* Alien. N. America. V.-c. 18. Dagenham Dock, 1939; *P.H.C.* V.-c. 21. Newgate Street, E.C., deliberately introduced, *J.E.L.*; *B.E.C. 1943-44 Rep.*, 876 (1946). Bombed site, Theobalds Road, W.C., 1950; *J.W.* Bombed sites, Cripplegate, *F.E.W.*; *Lond. Nat.*, *29*, 86 (1950).

FUMARIACEAE

CORYDALIS Vent.

C. CLAVICULATA (L.) DC. *Climbing Corydalis.* Woods, heaths and commons. Local. V.-c. 16. Eltham. *F.J.H.*; *Fl. Kent*, 22. West Wickham Common; Abbey Wood; Wickham Lane, Plumstead; *W.W.* Hayes Common, in quantity, 1937; *D.McC.* V.-c. 17. Oxshott Heath, 1899, *L.B.H.*; *Hb.H.*; 1925; *E.B.B.* Weybridge Heath, 1917, *C.L.W.*; *Hb.B.* Wimbledon Common; *W.W.*; increasing, 1950; *C.P.C.* Near Oxshott, 1937; *P.H.C.* Reigate Heath, 1925, *J.E.L.*; *Hb.L.*; 1950; *B.M.C.M.* V.-c. 21. Bombed site, Theobalds Road, 1950, *J.W.*; *Hb.Mus.Brit.* det. *E.B.Ba.* The plant was growing among bracken, and, though doubtless an introduction, is the first certain record for Middlesex; *D.H.K.* V.-c. 24. Wood near Black Park, 1947, *J.M.B.K.*; *Hb.K.*

C. BULBOSA (L.) DC., C. SOLIDA (L.) Ser. *Bulbous Corydalis.* Alien. Europe. V.-c. 17. Small patch by the Wandle, Ravensbury Park, near Mitcham, 1948; *R.A.B.* V.-c. 20. Wood near Broxbourne, 1913, *E.B.B.*; *Hb.B.*

C. LUTEA (L.) DC. *Yellow Corydalis.* Alien. S. Europe. Recorded on old walls as a semi-naturalised garden escape in v.-cc. 16, 17, 18, 20, 21 and 24. Unrecorded for v.-c. 19.

FUMARIA L.

The late Mr. H. W. Pugsley examined many gatherings of this critical genus.

F. BORAEI Jord. Cultivated and waste ground on light soils. Local. V.-c. 17. Ham gravel pits, 1944; *J.E.L.* West End Common, Esher, 1942, *A.E.E.*; *Hb.E.C.M.*; 1948; Croydon, 1948; *R.A.B.* V.-c. 21. Near Stanwell Moor, 1945, *B.W.* & *D.H.K.*; *Hb.K.* conf. by *H.W.P.* Heathrow; *B.W.*, *F.R.* & *D.H.K.* Rubbish tip, Hanwell, 1946, *D.H.K.*; *Hb.K.* det. *H.W.P.* Staines; Harmondsworth, 1946; rubbish tip, Hounslow, 1947; near Perry Oaks, 1948; garden weed, Farant Street, S.W.6, 1947; *D.H.K.*

F. MARTINII Clav. Cultivated ground. Very rare. V.-c. 17. Kingswood, near Chipstead, 1938, *A.E.E.*; *Hb.E.C.M.* det. *H.W.P.*; 1945; *A.E.E.*; 1950; *J.E.L.*

F. OFFICINALIS L. *Common Fumitory.* Cultivated and waste ground. Common and well distributed in all v.-cc. except 19, where though unrecorded it probably occurs.

var. WIRTGENI Hausskn. V.-c. 16. Green Street Green, Farnborough, 1937, *J.E.L.*; *Hb.L.* Crayford, *StJ.M.*; *B.E.C. 1927 Rep.*, 386 (1928). V.-c. 17. Epsom Downs, 1929, *J.E.L.*; near Fetcham Mill, 1929, *E.C.W.*; Warlingham, 1933, *J.E.L.*; *Hb.L.* Epsom College Farm, 1938; Ewell, 1942, *A.E.E.*; *Hb.E.C.M.* All det. *H.W.P.*

F. MICRANTHA Lag. Cultivated and waste ground on light soils. Local. V.-c. 16. Not uncommon in allotments near Dartford, 1914; *E.B.B.*; 1946; *P.H.C.* fide *F.R.* Green Street Green, Farnborough, 1937, *J.E.L.*; *Hb.L.*; 1946; *P.H.C.* fide *F.R.* Greenhithe, 1945; *F.R.* V.-c. 17. Between Leatherhead and Mickleham Downs, 1932; above Haling chalk-pit between Croydon and Purley, 1935, *J.E.L.*; *Hb.L.* Epsom College, 1938; West End, Esher, 1942, *A.E.E.*; *Hb.E.C.M.* Chipstead Valley, 1942, *J.E.L.*; *Hb.L.* Chalky field S.E. of Banstead Wood, 1950; *B.W.* V.-c. 21. Heathrow, abundant, 1945, *B.W.* & *D.H.K.*; *Hb.K.* conf. by *H.W.P.* Harmondsworth; near Staines, 1948; *D.H.K.*

× OFFICINALIS. V.-c. 17. Potato field, Epsom College, 1938, *A.E.E.*; *Hb.E.C.M.* det. *H.W.P.*

F. VAILLANTII Lois. Cultivated ground. Very rare. V.-c. 17. Near Headley, 1931, *I.A.W.*; *Hb.L.* det. *H.W.P.* Above Haling chalk-pit between Purley and Croydon, 1935, *J.E.L.*; *Hb.L.* Epsom College grounds, 1941 and 1942; market garden, Ewell, 1942; Mugswell, 1942, *A.E.E.*; *Hb.E.C.M.* All det. *H.W.P.* N. of Betchworth railway station, 1950; *B.W.*

F. PARVIFLORA Lam. Cultivated ground. Very rare. V.-c. 16. W. of Eynsford, 1920; *W.W.*

CRUCIFERAE

MATTHIOLA R.Br.

M. INCANA (L.) R.Br. Alien. Garden escape. V.-c. 21. Bombed site, Cripplegate, *F.E.W.*; *Lond. Nat.*, *29*, 86 (1950).

CHEIRANTHUS L.

C. CHEIRI L. *Wallflower.* A garden escape naturalised on chalky railway cuttings and old walls. Locally plentiful. V.-c. 16 Railway cutting by Knockholt station, 1913; Eltham, 1915; *E.B.B.* Railway cuttings between Otford and Shoreham, 1930; railway banks near Stone, 1932; Chelsfield railway station, 1937; *P.H.C.*; 1943; *D.H.K.* Railway cuttings from Dartford to Northfleet, 1943; *F.R.* Old walls, Abbey Wood Farm, 1930; *R.W.R.* Chalk-pits, Stone, 1950; *H.M.P.* V.-c. 17. Railway bank between Sutton and Cheam, 1935; *P.H.C.*

V.-c. 18. Eastbury Manor walls; *P.H.C.* V.-c. 19. Waltham Abbey, well established on old walls, 1905; *R.W.R.*; 1909; *P.H.C.* Farleys, Nazeing, 1911, *P.H.C.*; *Hb.L.N.H.S.* V.-c. 21. Old wall, Cranford, 1945; Colnbrook, 1946; *D.H.K.* V.-c. 24. Old walls, Denham Village, 1950; *D.H.K.*

NASTURTIUM R.Br.

N. OFFICINALE R.Br. *Water Cress.* Streams, brooks and watery places. Recorded from all the v.-cc. where it is probably common, though the distribution of the species as now understood is not yet fully worked out.

× MICROPHYLLUM. V.-c. 17. Richmond Park, 1946, *E.N. & E.M.R.*; *Hb.Kew.* V.-c. 21. Finchley Common, 1949; *D.H.K.*

N. MICROPHYLLUM (Boenn.) Rchb., N. UNISERIATUM Howard & Manton. *Water Cress.* In similar situations to the preceding species and sometimes growing in company with it. Probably common, though its distribution in the London area is not yet fully worked out. V.-c. 17. Bookham Common, 1950, *A.H.G.A. & E.B.Ba.*; *Hb.Mus.Brit.* Stew Ponds, Epsom Common, 1950; *L.M.P.S.* det. *D.H.K.* V.-c. 20. Totteridge, 1899, *E.M.D.*; *Hb.Mus.Brit.* V.-c. 21. West Heath, Hampstead, 1949; Finchley Common, 1949; Stanmore Common, 1950, *D.H.K.*; *Hb.K.*

RORIPPA Scop.

R. SYLVESTRIS (L.) Besser., NASTURTIUM SYLVESTRE (L.) DC. *Creeping Yellow Cress.* River and stream sides, pond verges, roadsides and waste ground. Although characteristically a plant of wet places, it also occurs in very dry situations not infrequently. Rather common. V.-c. 16. Chislehurst Common; *W.W.* Betsham; Westerham; Locks Bottom; Bromley; Mottingham; Northfleet; Hayes; *P.H.C.* Hayes Common; *D.McC.* Dartford; between Farningham and Horton Kirby, 1950; *H.M.P.* V.-c. 17. Mitcham Common, 1925; on chalky rubble by Leatherhead By-pass, 1932, *J.E.L.*; *Hb.L.* Sutton railway station; Norwood Park, 1930; Richmond to Kingston, 1931, near Chessington, 1933; *P.H.C.* V.-c. 18. Hare Street, 1908; *P.H.C.* Near Abridge, 1938, *P.H.C.*; *Hb.L.N.H.S.* V.-c. 19. Roydon, 1936; *P.H.C.* V.-c. 20. Broxbourne to Rye House, 1930; *P.H.C.* V.-c. 21. Uxbridge; *C.S.N.* Thames at Chertsey Bridge, 1893; *C.S.N.*; 1940; *D.H.K.* Southall; Hendon, 1909; *P.H.C.*; 1945; *D.H.K.* Enfield, 1926; *L.J.T.* Elstree Reservoir; Cowley Peachey; Teddington; Twickenham; Yeading; Northolt; Osterley Park; canal side, Southall to Brentford; North Finchley; Golders Green; East and West Heaths, Hampstead; Primrose Hill; *D.H.K.*

R. ISLANDICA (Oeder) Borbas., NASTURTIUM PALUSTRE DC. *Marsh Yellow Cress.* River and stream sides, pond verges and waste ground. Common and well distributed, especially by the Thames, in all the v.-cc., except 19, where it is so far unrecorded.

R. AMPHIBIA (L.) Besser., NASTURTIUM AMPHIBIUM (L.) R.Br. River and stream sides and damp places. Locally plentiful. V.-c. 16. Hayes, 1937, *P.H.C.*; *Hb.L.N.H.S.* V.-c. 17. Many records from the Thames between Weybridge and Hammersmith. In dry bed of River Mole near Leatherhead in great quantity, 1934; *R.W.R.* V.-c. 18. Walthamstow Reservoir, 1913; *C.N.* V.-c. 19. Waltham Abbey, 1911, *P.H.C.*; *Hb.L.N.H.S.* V.-c. 20. Lea Navigation, Broxbourne; *P.H.C.* V.-c. 21. Frequent by the Thames from Staines to Hammersmith; canal bank, Hanwell and Perivale; Lea Navigation between Waltham Cross and Edmonton; Poyle; Yeoveney; *D.H.K.* Cranford; Southall; Hendon; *P.H.C.* Whitchurch Common; *H.S.* The var. AURICULATUM (Beck.) was found at v.-c. 17. Burford Bridge, 1904, *A.O.H.*; *Hb.L.*

×ISLANDICA. V.-c. 17. Thames embankment by Hammersmith Bridge, 1932; Thames side between Mortlake and Kew, 1942, *J.E.L.*; *Hb.L.*; 1950; *D.H.K.* V.-c. 21. Thames side by Barnes Bridge, 1944; *D.H.K.*

R. AUSTRIACA (Crantz) Besser. Alien. Europe. Now well naturalised in v.-c. 21. Several large patches for a distance of half-a-mile on waste ground by the Thames at Chiswick, 1941, *N.D.S. & N.Y.S.*; *B.E.C. 1941-42 Rep.*, 480 (1944); 1943, *J.E.L.*; *Hb.L.*; increasing, 1950; *D.H.K.*

BARBAREA R.Br.

B. VULGARIS R.Br. *Yellow Rocket, Winter Cress.* Streamsides, damp waste ground, railway banks and roadsides. Common and well distributed.

B. STRICTA Andrz. Streamsides. Rare. V.-c. 17. Bank of River Thames near Kew Gardens, 1915, *C.S.N.*; *Hb.B.* Towing path between Kew and Richmond, 1925, *J.E.L.*; *Hb.L.*; still there; Ham; *J.E.L.* Near stream, Old Deer Park, Richmond; *B.W.*; 1950; *L.N.H.S. Excursion.* V.-c. 21. Banks of River Cran, Twickenham, six plants, 1933; *G.W.* Ha Ha, Syon Park, 1946, *A.B.J.*, *B.W.*, *H.S.* & *D.H.K.*; *Hb.K.* det. *A.B.J.*

B. INTERMEDIA Boreau. Cultivated and waste ground. Rare. V.-c. 16. Woolwich Arsenal, 1943; *F.R.* V.-c. 21. Waste ground by the Thames, Chiswick, 1945, *A.B.J.*; *Hb.K.*; 1948, *D.H.K.*

B. VERNA (Mill.) Aschers. *American Winter Cress.* Cultivated and waste ground. Rare and usually only casual. V.-c. 17. Near Fetcham, 1916; *E.B.B.*; *Hb.B.* Waste ground by the Thames adjoining Hampton Court Bridge, 1914; *E.B.B.* Coulsdon, 1942; *J.E.L.* V.-c. 21. Acton, 1902, *C.B.G.*; *Hb.S.L.B.I.* Rubbish tip, Uxbridge Moor, 1946; West Drayton, 1938; cultivated field, Sutton, 1950; *D.H.K.*

ARABIS L.

A. HIRSUTA (L.) Scop. *Hairy Rock Cress.* Dry calcareous places. Locally plentiful. V.-c. 16. Between Downe and Orpington, *F.J.H.*; *Fl. Kent*, 28. V.-c. 17. Box Hill, 1901, *L.B.H.*; *Hb.H.*; by Zig-Zag, 1923; Banstead Downs, 1928, *J.E.L.*; *Hb.L.* Marden Park, near Caterham, 1917; *R.W.R.* Farthing Downs, Coulsdon, 1920; *W.W.* Headley Lane, 1936; *P.H.C.*; 1942; *B.W.*; 1950; *B.M.C.M.* Lower end of Juniper Bottom, 1949; *B.W.* V.-c. 21. Hackney Marshes, 1914; *J.E.C.* Adventive here; *D.H.K.*

A. CAUCASICA Willd. Alien. Europe. Garden escape. V.-c. 17. Limpsfield Common, *R.W.R.*; *Lond. Nat.*, *19*, 25 (1940).

TURRITIS L.

T. GLABRA L. *Smooth Rock Cress.* Dry banks. Very rare. V.-c. 24. Roadbank near Fulmer, several plants, 1943; *D.H.K.*

CARDAMINE L.

C. AMARA L. *Large Bittercress.* Stream and pond sides, marshes and wet meadows. Local. V.-c. 16. Crofton; *W.W.* Sutton at Hone, 1901; *P.H.C.*; 1946; *F.R.* By Darenth Church, 1944; *F.R.* V.-c. 17. Near Kew, 1907, *C.S.N.*; *Hb.L.N.H.S.* Bank of Kew Gardens Moat near Isleworth Gate, 1946, probably lost through disturbance, 1949; *B.W.* Canal banks between West Weybridge railway station and Anchor Inn, 1932; Reigate Heath, 1925, *J.E.L.*; *Hb.L.* Marsh near Oxted, 1923; *R.W.R.* Cobham, 1927; *L.J.T.* V.-c. 20. By the Colne near Rickmansworth, 1938; *D.H.K.* V.-c. 21. Harmondsworth, 1909, *B.T.L.*; *Hb.L.N.H.S.* Between Colnbrook and Harmondsworth, 1922; *H.J.B.* Near Colnbrook, 1910; *C.S.N.*; 1931; *C.E.L.* Longford, 1915; *J.E.C.* Canal side, Harefield, 1928; *B.T.W.*; 1946; *D.H.K.* Near Springwell Lock, 1936, *J.E.L.*; *Hb.L.*; 1946, *D.H.K.*; *Hb.K.* Yiewsley, 1902; near Denham Lock, 1913; *J.E.C.* Gutteridge Wood, Northolt, 1947; *D.H.K.* Osterley Park, 1948; *L.G.P.* The var. ERUBESCENS Peterm. occurred in v.-c. 17. Ham Haw, Weybridge, 1927, and Addlestone, 1928, *J.Fr.*; *Hb.L.* See *Watson B.E.C. 1930-31 Rep.*, 58, etc. V.-c. 21. By canal side near Denham, 1944; *D.H.K.*

C. PRATENSIS L. *Cuckoo Flower, Lady's Smock.* Wet meadows, woods, railway banks and as a weed of garden lawns. Common and well distributed throughout the area. The usual form is the var. PALUSTRIS Wimm. & Grab., but the var. DENTATA (Schultes) occurred at v.-c. 21. Gutteridge Wood, Northolt, 1947, *D.H.K.*; *Hb.K.* Plants with double flowers are recorded from v.-c. 17. Woodcote Park, 1932, *L.C.W.*; *Hb.L.* V.-c. 21. Harefield; Springwell; *C.B.G.*

C. FLEXUOSA With. *Wood Bittercress.* Woods, ditches and damp shady places. Frequent and well distributed.

C. HIRSUTA L. *Hairy Bittercress.* Dry banks, stony places and walls. Common and widely distributed.

DENTARIA L.

D. BULBIFERA L. *Coral Root.* Woods and plantations on and near calcareous soils. Locally abundant. V.-c. 20. Finch's Avenue, Watford. 1901, *C.S.N.*; near Sarratt, 1913, *P.H.C.*; *Hb.L.N.H.S.*; 1950; *R.A.G.* Near Croxley Green, 1916; *E.B.B.* Chandlers Cross, 1927, *I.H.*; *Hb.L.* Garett Wood, Springwell, abundant, 1939, *D.H.K.*; *Hb.K.* Whippendell Wood, near Watford, 1940; near Chorley Wood, 1949; *D.H.K.* V.-c. 21. Grove near Harefield Church, 1927; *L.J.T.*; 1950, rare; *D.H.K.* Copse near Jacks Lock, Harefield, 1928; *H.S.*; abundant, 1950; *D.H.K.* Old Park Wood, Harefield, in profusion, known here for over 200 years; Garett Wood, Springwell, abundant, *D.H.K.*; *Hb.K.*

LUNARIA L.

L. ANNUA L. Alien. S. Europe. Garden outcast. V.-c. 17. Hedgebank, Bookham Common, 1951; *E.B.Ba. & C.P.C.* V.-c. 20. S. of Hern Hill and W. of Troy Mill, a single plant a few yards within the Herts. county boundary, 1921; *L.J.T.* V.-c. 21. Long Wood, Wyke Green, 1933; *D.H.K.* Bombed site, Cripplegate, *F.E.W.*; *Lond. Nat.*, *29*, 86 (1950).

AUBRETIA Adans.

A. DELTOIDEA (L.) DC. Alien. Greece. Garden outcast. V.-c. 21. Rubbish-tip, Brent Reservoir, Hendon, 1945; *D.H.K.*

BERTEROA DC.

B. INCANA (L.) DC., ALYSSUM INCANUM L. Alien. Europe. V.-c. 16. Bickley, 1909; Catford, 1916; *B.T.L.* Crayford, 1910; *J.E.C.* Dump near Otford, 1933; Shoreham; *P.H.C.* V.-c. 17. Mitcham, 1937, *P.H.C.*; *Hb.L.N.H.S.* V.-c. 18. Woodford Green, 1905; *C.N.* Purfleet, 1908; Grays, 1912; *P.H.C.* Chigwell; *S.A.* V.-c. 20. Rye House, 1910, *P.H.C.*; *Hb.L.N.H.S.* Rickmansworth, 1912; *P.H.C.* V.-c. 21. Crouch End, 1897; Finchley, 1900 and 1909; Muswell Hill, 1904; Yiewsley, 1910-11; Cowley, 1913; Temple Fortune, 1914-15; *J.E.C.* Harlington, gravel pit, 1936; *P.H.C.* West Drayton, 1942; rubbish-tip, Hanwell, 1946; *D.H.K.* V.-c. 24. Langley, 1905; *L.B.H.*

LOBULARIA Desv.

L. MARITIMA (L.) Desv., ALYSSUM MARITIMUM (L.) Lam. Alien. Europe. Garden outcast. V.-c. 16. Downe, 1936; *P.H.C.* Green Street Green, Farnborough, 1938; *D.McC.* V.-c. 17. Limpsfield Common, *R.W.R.*; *Lond. Nat.*, *19*, 25 (1940). Rubbish-tip, Mortlake, 1950; *D.H.K.* V.-c. 20. Rubbish-tip, Bushey, 1950, *R.A.G. & D.H.K.* V.-c. 21. Crouch End, 1897; Yiewsley, 1912; *J.E.C.* Hampton Court, 1910, *P.H.C.*; *Hb.L.N.H.S.*; 1913; *L.J.T.* Ferry Lane, Brentford, 1941; rubbish-tips, Hanwell and Greenford, 1945-50; *D.H.K.* Rubbish-tip, Hounslow Heath, 1947; *B.W.*

DRABA L.

D. MURALIS L. *Wall Whitlow-grass.* Old walls. Very rare. V.-c. 20. Loudwater, near Rickmansworth, 1932, *A.H.C.*; *Hb.L.*; 1949; *J.E.L.*; 1951; *R.A.G. & D.H.K.*

EROPHILA DC.

E. VERNA (L.) Chevall. (Including E. BOERHAAVII (Van Hall) Dumort). *Common Whitlow-grass.* Walls, sand- and gravel-pits, ant-heaps, dry grassy places and banks. Formerly common but now less often recorded. V.-c. 16. Near Eynsford, 1916; *E.B.B.* Farningham, 1922; *L.J.T.* Hayes Common, 1938; *D.McC.* Keston; Dartford Heath; *F.R.* V.-c. 17. Box Hill, 1900, *L.B.H.; Hb.H.* Hurst Park Racecourse, 1915, *J.E.W.*; Worms Heath, 1923; Reigate Heath, 1931, *J.E.L.*; *Hb.L.* Near Weybridge, 1919, *E.B.B.*; *Hb.B.* Limpsfield, local. 1921; Barrow Green, Oxted, 1927; *R.W.R.* Riddlesdown, 1930; Oxted Churchyard, 1937; *P.H.C.* Near Mickleham Downs, 1926; *L.J.T.* V.-c. 18. Pole Hill, Chingford, 1902; *J.O.B.* South Ockendon; *P.H.C.* V.-c. 19. Galley Hill Wood, 1909, *P.H.C.*; *Hb.L.N.H.S.* V.-c. 20. Elstree Reservoir, 1902; *L.B.H.* Broxbourne, abundant; *E.M.D.* Cheshunt College walls; *C.S.N.* Rye House, 1908; Loudwater, near Rickmansworth, 1913; *P.H.C.* V.-c. 21. Acton; *A.L.* Railway banks, Potters Bar and near South Mimms; Whitchurch Common, 1902; *C.S.N.* Brent Meadows, Hanwell, 1899; *A.W.B.* Shepperton, 1905; *C.S.N.*; 1950; *D.H.K.* Harmondsworth, 1909; *P.H.C.* West Drayton, 1926; *L.J.T.* Canal bank near Denham Lock, 1945; near Uxbridge Common, 1945, *D.H.K.*; *Hb.K.* Cowley, 1903; Stanmore, 1904, *C.B.G.*; *Hb.S.L.B.I.* Several places near Hampton Court, 1947, *B.W.*; *Hb.K.*; 1950; *L.N.H.S. Excursion.* Thames bank Staines to Chertsey Lock, 1950, *D.H.K.*; *Hb.K.* V.-c. 24. Denham; *P.H.C.*; 1950, *D.H.K.*; *Hb.K.*

COCHLEARIA L.

C. OFFICINALIS L. *Scurvy Grass.* Muddy places by rivers. Very rare. V.-c.18. River Roding, Ilford, 1912; *R.W.R.* V.-c. 21. Waste ground close to Tower Hill railway station and All Hallows Church, a number of seedlings, but only one plant in flower, 1951; *W.N.L. fide E.B.Ba.* Adventive here; *D.H.K.*

C. ANGLICA L. *English Scurvy Grass.* Muddy banks of tidal rivers. Rare. V.-c. 16. Swanscombe Marsh, 1919, *P.H.C.*; *Hb.B.*; 1946; Plumstead Marshes, 1943; *F.R.* Stone Marsh, 1931; *P.H.C.*; *Hb.L.N.H.S.*; 1945; *F.R.* Erith; *R.A.B.* V.-c. 18. Rainham, 1905, *L.B.H.*; *Hb.H.*; 1909; *P.H.C.* Grays, 1910, *P.H.C.*; *Hb.L.N.H.S.* Creekmouth, 1951; *J.E.L.*

C. DANICA L. *Danish Scurvy* Grass. Alien. Europe, including parts of Britain. Naturalised on railway tracks. Very local. V.-c. 21. Growing plentifully between the metals on railway main line by Scratch Wood Sidings near Edgwarebury, 1951, *J.G.D.*; *Hb.K.* No doubt introduced from the coast with shingle ballast; *D.H.K.*

C. GLASTIFOLIA L. Alien. Europe. V.-c. 17. Bomb-crater, Brockham Hill, 1948, *J.E.L.; Hb.L.*

ARMORACIA Gaertn., Mey. & Scherb.

A. RUSTICANA Gaertn., Mey. & Scherb., A. LAPATHIFOLIA Gilib., COCHLEARIA ARMORACIA L. *Horse Radish.* An escape from cultivation now abundantly naturalised by stream sides and on railway banks and waste ground throughout the area.

HESPERIS L.

H. MATRONALIS L. *Dame's Violet.* Alien. Europe. Naturalised by stream sides and on waste ground. Rare. V.-c. 16. New Eltham, 1890; Shoreham, 1939; *P.H.C.* Northfleet Green, 1919, *P.H.C.*; *Hb.L.N.H.S.* Hayes, 1935-36; *D.McC.* V.-c. 17. Thames side, Molesey, 1905; *L.B.H.*; *Hb.H.* Claygate; *P.H.C.* Limpsfield Chart, 1927; *R.W.R.* Ham gravel-pits, on tipped rubble, 1943 to 1946; *B.W.* V.-c. 19. North Weald Bassett, 1951; *R.M.P.* V.-c. 21. Yiewsley, 1908; *J.E.C.* Near East Finchley, 1909, *C.B.G.*; *Hb.S.L.B.I.* Disused sand-pit between Harefield and Ickenham, 1944, *H.W.Pa. & D.H.K.*; *Hb.K.*; 1950; *R.A.G.* Bombed site between Silver Street and Cheapside, E.C.; *W.J.L.S. & D.McC.* Weed in Hyde Park, 1940; *G.M.G.* West Heath, Hampstead, one plant, 1949; *E.C.W. & D.H.K.*

MALCOLMIA R.Br.

M. MARITIMA (L.) R.Br. Alien. Europe. V.-c. 18. Dagenham, 1920, *L.B.H.*; *Hb.H.*

ARABIDOPSIS Heynh.

A. THALIANA (L.) Heynh., SISYMBRIUM THALIANUM (L.) Gay. *Thale Cress.* Walls, dry sandy banks and cultivated ground. Locally plentiful. V.-c. 16. Near Knockholt railway station, 1915; Keston Lodge; Hayes, 1918; West Wickham, 1919; *L.J.T.* Southfleet, 1919; Chelsfield to Shoreham; Brasted to Chevening; Farningham to Eynsford, 1930; *P.H.C.* V.-c. 17. Frequent on light soils. V.-c. 18. Woodford, 1902; *R.W.R.* Brentwood, 1930; South Ockendon, 1913; Coopersale; Ongar; *P.H.C.* Bulpham, 1909, *P.H.C.*; *Hb.L.N.H.S.* V.-c. 19. Roydon, 1915; *C.S.N.* V.-c. 20. Broxbourne; *E.M.D.* Rickmansworth, 1904; London Colney, 1909, *C.S.N.*; *Hb.L.N.H.S.* Chandlers Cross; Radlett; Oxhey Lane; *C.S.N.* Essendon; Bricket Wood; Park Street; Cheshunt; *P.H.C.* Near Moor Park, 1928; *B.T.W.* V.-c. 21. Common on light soils in the south-western parts of the county. Potters Bar, 1902, *C.S.N.*; *Hb.L.N.H.S.* Kensal Rise, 1909; *P.H.C.* Uxbridge; Harefield; *L.J.T.* Northwood; Ruislip; Hanwell; *D.H.K.* V.-c. 24. Iver Heath, 1936; *P.H.C.* Old walls, Denham Village, 1950; *D.H.K.*

SISYMBRIUM L.

S. OFFICINALE (L.) Scop. *Hedge Mustard.* Hedgebanks, waste ground, streamsides, roadsides, etc. Very common throughout the area. The var. LEIOCARPUM DC. appears to be common.

S. ALTISSIMUM L., S. PANNONICUM Jacq. A native of Europe, now commonly naturalised, and increasing, on rubbish dumps and waste ground throughout the area with the exception of v.-c. 19 where it has not yet been recorded.

S. ORIENTALE L., S. COLUMNAE Jacq. A native of Europe, now naturalised on rubbish tips and waste ground. Common. V.-c. 16. Abbey Wood, 1926, *St.J.M.*; *Hb.L.* Keston, 1936; Joyden's Wood, 1938; Woolwich Arsenal, 1943; *P.H.C.* Darenth village, 1945; *H.M.P.* V.-c. 17. Ham gravel-pits, 1930; Headley Lane, 1932, *J.E.L.*; *Hb.L.* Mortlake, 1923; *J.E.C.* Epsom, 1938; *A.E.E.* V.-c. 18. Dagenham, 1939; *D.H.K.* V.-c. 20. Rubbish-tip, Bushey, 1950; *R.A.G. & D.H.K.* V.-c 21. Hackney Marshes, 1909, 1912-15, 1918-20, 1924, 1926; Yiewsley, 1914, 1919, 1924; *J.E.C.*; 1948; *D.H.K.* Bombed site, South Harrow; West Ealing, 1943-44; rubbish-tip, Hanwell, abundant, 1946; canal bank, Westbourne Park, 1948; Hounslow Heath, 1948-50; *D.H.K.* Harefield, 1948; *B.W.* Bombed site, Ebury Street, S.W.1; *D.McC.* Bombed sites, Cripplegate, locally abundant, *F.E.W.*; *Lond. Nat.*, *29*, 86 (1950).

S. Irio L. *London Rocket.* An alien species widespread in Europe and Asia. Naturalised on waste ground. Very rare. V.-c. 21. Near the City boundary, east side, 1947, *J.E.L.*; *Hb.L.*; 1948, *D.H.K.*; *Hb.K.*; 1948, three colonies; *J.E.L.*; still there, 1951; *J.E.L.*

S. strictissimum L. Alien. Europe. Possibly originally planted but now naturalised in v.-c. 17. Kew Churchyard, 1940; *D.H.K.* V.-c. 21. Belgrave Square, S.W.1., 1945; *B.W.*; *D.H.K.*; *Hb.K.*; *J.E.L. & L.G.P.*; *Hb.L.* St. Olaves, Hart Street, E.C., 1945; *J.E.L.*

S. pyrenaicum (L.) Vill. Alien. Europe. V.-c. 21. West Drayton, 1912, *P.H.C.*; *Hb.L.N.H.S.*

S. erysimoides Desf. Alien. Mediterranean Region. V.-c. 16. Hextable, 1948, *D.McC.*; *Hb.L.* Introduced with shoddy; *J.E.L.*

S. Loeselii L. Alien. Europe. Naturalised on rubbish-tips and waste ground. Not common, but increasing. V.-c. 17. Mitcham Common, 1925, *D.G.C.*; *Hb.L.* Ham gravel-pits; *J.E.L.*; 1944, *D.H.K.*; *Hb.K.* V.-c. 18. Dagenham Dump, 1934, *J.E.L.*; *Hb.L.* East Ham and Barking By-Pass, Creekmouth and Dagenham, abundant, 1951; *J.E.L.* V.-c. 21. Hampstead, 1910; Yiewsley, 1911-12; *J.E.C.* Hendon, 1910, *P.H.C.*; *Hb.L.N.H.S.*; 1945; *D.H.K.*; 1949; *L.N.S. Excursion.* Russell Square, W.C., 1945; *J.W.B.* teste *B.W.*; 1948; *D.H.K.* Bombed sites, Bedford Way, W.C., abundant, 1950; *J.W.* By Southwark Bridge, 1945-51, *J.E.L.*; *Hb.L.* Rubbish-tip, Hanwell, abundant, 1946; Yiewsley; rubbish-tips, Uxbridge Moor and Stonebridge; Osterley Park; near Finchley; Palmers Green; *D.H.K.*

DESCURAINIA Webb & Berthel.

D. Sophia (L.) Webb, Sisymbrium Sophia L. *Flixweed.* Rubbish-tips and waste ground. Not common. V.-c. 16. Crayford, 1916; *J.E.C.* Dartford, 1930; *P.H.C.* Bromley, 1940; *H.N.* Thames side near Erith, several plants, 1948; *R.A.B.* By Cotton Farm, Stone, 1949, *H.M.P.* teste *F.R.* V.-c. 17. Mortlake, 1916-17, 1921-22; *J.E.C.* Norwood, 1930; Barnes, 1932; *P.H.C.* Earlswood brickfields, 1948, *B.M.C.M.*; *Hb.L.* V.-c. 18. Theydon, 1900; Dagenham, 1920; *L.B.H.*; 1949; *D.H.K.* Grays, 1909, *P.H.C.*; *Hb.L.N.H.S.* V.-c. 21. West Drayton, 1909; by canal, Harefield, 1930; Mill Hill; *P.H.C.* Winchmore Hill, 1919, *L.B.H.*; *Hb.H.* Yiewsley, 1909-15; Finchley, 1910; Hackney Marshes, 1912; *J.E.C.* Rubbish-tip, Hanwell, 1944-50; rubbish-tip, Dawley, 1948; roadside near Sudbury Hill, 1947; rubbish-tip, Greenford, 1947, *D.H.K.*; *Hb.K.* V.-c. 24. Near Iver, 1910, 1917-18, 1920-25; Uxbridge, 1912; *J.E.C.*

ALLIARIA Scop.

A. PETIOLATA (M. Bieb.) Cavara & Grande., SISYMBRIUM ALLIARIA (L.) Scop. *Garlic Mustard, Jack-by-the-Hedge.* Hedgebanks, wood borders, etc. Very common throughout the area.

ERYSIMUM L.

E. CHEIRANTHOIDES L. *Worm Seed, Treacle Mustard.* Cultivated and waste ground, especially on light soils. Rather common. V.-c. 16. West Wickham, 1922, *J.E.L.*; Hayes, 1926, *F.G.S.*; *Hb.L.*; 1938; Bromley; Keston, 1938; *D.McC.* Dartford, 1930; *P.H.C.* V.-c. 17. Weybridge, 1899, *L.B.H.*; *Hb.H.* Near Thorpe, 1917; *E.B.B.* Wallington, 1917; Walton to Cobham, 1930; Ashtead; *P.H.C.* By Richmond railway station, 1943-45; Roehampton Vale, 1944; *B.W.* V.-c. 18. Hale End, 1903; *C.N.* Chigwell; *R.W.R.* Cranham, 1913; Bentley; *P.H.C.* Between Epping and Steward's Green, 1951; *R.M.P.* V.-c. 20. Croxley Green; Northaw, 1913; Rickmansworth; *P.H.C.* V.-c. 21. Crouch End, 1912, *C.S.N.*; *Hb.L.N.H.S.* South Mimms; Staines Moor; Hayes; *P.H.C.* Frequent near the Thames from Staines to Twickenham; Uxbridge; Ruislip; Greenford; Isleworth; Heathrow; Ealing; Hendon; Kensington Gardens; Russell Square; *D.H.K.* Bombed site, Ebury Street, S.W.1; *D.McC.* Brooks Wharf, E.C.; *J.E.L.* Bombed site, Millman Street, W.C.1, abundant, 1950; *J.W.* Bombed sites, Cripplegate, *F.E.W.*; *Lond. Nat.*, *29*, 86 (1950). Now frequent in the City, 1951; *J.E.L.* V.-c. 24. Iver, 1909, *P.H.C.*; *Hb.L.N.H.S.*; 1931; *J.C.R.* Uxbridge, 1910; *J.E.C.* Horton, 1921; *L.J.T.*

E. REPANDUM L. Alien. Europe. V.-c. 21. Yiewsley, 1907, *J.E.C.*; *Hb.Mus.Brit.*

×E. MARSHALLII Hort. *Siberian Wallflower.* Alien. Garden outcast. V.-c. 21. Rubbish-tip, Hanwell, 1946, *D.H.K.*; *Hb.K.*

E. HELVETICUM DC. Alien. Europe. V.-c. 17. Bomb-crater, Brockham Hill, 1948, *J.E.L.*; *Hb.L.*

CONRINGIA Adans. em Link.

C. ORIENTALIS (L.) Dumort. Alien. Europe. V.-c. 16. Hayes, 1926, *F.G.S.*: *Hb.L.* V.-c. 18. Grays; *P.H.C.* V.-c. 21. Hendon, 1910, *P.H.C.*; *Hb.L.N.H.S.* Near Crouch End, 1898; Finchley, 1909; Hackney Marshes, 1913; *J.E.C.*

CAMELINA Crantz.

C. SATIVA (L.) Crantz (including C. ALYSSUM (Mill.) Thell. and C. SYLVESTRIS Wallr.). *Gold of Pleasure.* Alien. Europe. V.-c. 17. Mitcham Common; *P.H.C.* Wallington, 1940, *A.L.S.*; Wimbledon Common, on rubble from bombed houses, 1943, *J.E.L.*; *Hb.L.* One plant N. of Betchworth railway station, 1950; *B.M.C.M.* & *B.W.* V.-c. 18. Woodford Green; *C.N.* Rainham, 1905, *L.B.H.*; *Hb.H.* V.-c. 21. Crouch End, 1887; Muswell Hill, 1906 and 1909; Yiewsley, 1908-9, 1912-13; *J.E.C.* West Drayton; *C.S.N.* Hendon, 1910, *P.H.C.*; *Hb.L.N.H.S.* Rubbish-tip, Hanwell, one plant, 1947, *D.H.K.*: *Hb.K.*; abundant, 1951; rubbish-tip, Greenford, 1951, *D.H.K.*; *Hb.K.* Rubbish-tip near Harefield, 1951; *T.G.C.*

BRASSICA L.

B. OLERACEA L. *Cabbage.* Alien. Frequent on rubbish-tips as an outcast from cultivation, also reported as naturalised in v.-c. 16. Railway cutting on chalk E. of Dartford, 1943; *F.R.* The var. GONGYLOIDES L. (*Kohlrabi*) and subvar. SABAUDA O. E. Schulz. (*Savoy*), also occur commonly on tips.

B. NAPUS L. *Rape.* Alien. Not uncommon on field borders and in waste places as a relic of, or escape from, cultivation.

B. RUTABAGA DC. *Swede.* Alien. Found here and there as a stray from cultivation.

B. RAPA L. *Wild Turnip.* Apparently common and widely distributed on waste ground, field borders and by streamsides. The var. SYLVESTRIS H. C. Watson is recorded from v.-c. 17. Weybridge; *P.H.C.* Thames side between Kew and Richmond, 1932, *J.E.L.*; *Hb.L.* V.-c. 20. By the Lea from Broxbourne to Rye House; *P.H.C.* V.-c. 21. Frequent by the Thames from Staines to Hampton, *C.S.N.*; *Hb.L.N.H.S.*; 1950; *D.H.K.* Banks of Lea Navigation Canal between Ponders End and Tottenham; *D.H.K.* The " Thames-side Brassica " was the subject of several interesting papers by H. C. Watson and others in 1869/70. Prof. L. H. Bailey has more recently confirmed the original discoverers' opinion that it is the wild form of the turnip—see *J. Bot., 61,* 104-5 (1923).

B. ELONGATA Ehrh. Alien. Europe. V.-c. 21. Finchley, 1911-12; *J.E.C.*

B. NIGRA (L.) Koch. *Black Mustard.* Stream banks, waste ground and hedgebanks. Not common, except on rubbish-tips and waste places in S. Essex. V.-c. 16. Greenhithe, *F.J.H.*; *Fl. Kent,* 37. Stone Marshes, 1938, *P.H.C.*; *Hb.L.N.H.S.* V.-c. 17. Ham gravel pits, 1942; *D.H.K.* V.-c. 18. Purfleet, 1936; *P.H.C.* Dagenham Dock, 1936; *J.E.L.* Common about Barking, Creekmouth and Dagenham, 1951; *J.E.L.* V.-c. 21. Hackney Marshes, 1912 and 1919; Yiewsley, 1914 and 1916; *J.E.C.* Harefield; near Denham; Shepperton; Hampton Court; Dawley; Stanwell Moor; Hounslow Heath; near Southall; Brentford; Chiswick; Willesden Green; *D.H.K.*

B. JUNCEA (L.) Czern. & Coss. Alien. Asia. Probably frequent and often overlooked. V.-c. 17. Rubbish-tip, Mortlake, 1950; *D.H.K.* V.-c. 21. Hendon, 1912, *P.H.C.*; *Hb.L.N.H.S.* Among crops, South Mimms, 1946; rubbish-tip, Hounslow Heath, 1946; Cowley, 1947; Yiewsley; Uxbridge, 1948; near Hampton Court, 1947; Shortwood Common, 1948; South Harrow; roadside, Sudbury Hill, 1947; rubbish-tip, Stonebridge, 1947; bombed site, West Ealing, 1947; Brent banks between Perivale and Greenford, 1947; near Palmers Green, 1947; Finchley Common; Hackney Marshes; Hyde Park, 1947; *D.H.K.* Brentford; rubbish-tip, Hanwell, 1947, *N.Y.S. & D.H.K.*; *Hb.K.* det. *N.Y.S.*; 1948-50.

B. INTEGRIFOLIA (West.) O. E. Schulz var. CARINATA (A.Br.) O. E. Schulz. Alien. N.E. Africa. V.-c. 21. Air raid shelter, Chelsea Embankment Gardens, *F.D. & N.Y.S.*; *J. Bot.*, *79,* 86 (1941).

SINAPIS L.

S. ARVENSIS L. *Charlock.* Cultivated ground and waste places. A common weed all over the area.

S. ALBA L. *White Mustard.* Cultivated and waste ground. Apparently common and well distributed in v.-cc. 16, 17, 20, 21 and 24. It has not been recorded from v.-cc. 18 and 19 but doubtless occurs.

ERUCASTRUM (DC.) Presl.

E. GALLICUM (Willd.) O. E. Schulz, BRASSICA GALLICA (Willd.) Druce. Alien. Europe. V.-c. 17. Merton, 1928, *C.E.B.*; Tamworth Lane, Mitcham, 1930; gravel-pit, Mitcham Junction, 1941, *J.E.L.*; *Hb.L.* V.-c. 21. Hackney Marshes, 1919; Finchley, 1926, *J.E.C.*; *Hb.Mus.Brit.* Hendon, 1927; *J.E.C.*

DIPLOTAXIS DC.

D. TENUIFOLIA (L.) DC. *Wall Rocket.* Old walls, railway tracks and waste ground. Local. V.-c. 16. Locally abundant, especially about railway premises, from Westerham, Hayes and Dartford to Woolwich and New Cross; *F.R.* V.-c. 17. Ham gravel-pits; *P.H.C.* Riddlesdown; Epsom Downs; *R.W.R.* Old Deer Park, Richmond, 1950; *B.W.* V.-c. 18. Plentiful about railway premises at Tilbury, Purfleet, Rainham, etc. V.-c. 21. Isleworth, one plant, 1942; *D.H.K.* Waste ground, Brentford, 1943-44; *B.W.* Locally abundant on bombed sites in the City of London, *J.E.L.*; *B.E.C. 1943-44 Rep.*, 877 (1946). Greenford, 1945, *D.H.K.*; *Hb.K.* Bombed sites, Stepney, Limehouse, Poplar and the Isle of Dogs, 1945-47; *D.H.K.* Bombed site, Woburn Place, W.C.1, abundant, 1950; *J.W.*

D. MURALIS (L.) DC. *Sand Rocket.* Old walls, railway tracks, canal paths and waste ground. Common and widely distributed. The var. CAULESCENS Kittel is possibly as common as the type.

D. ERUCOIDES (L.) DC. Alien. S. Europe. V.-c. 17. Bomb-crater, Brockham Hill, 1948, *J.E.L.*; *Hb.L.*

ERUCA Mill.

E. SATIVA Garsault Alien. Europe. V.-c. 16. Lullingstone Castle, 1950, *H.W.Pa.*; *Hb.K.*

CAPSELLA Medik.

C. BURSA-PASTORIS (L.) Medik. *Shepherd's Purse.* An ubiquitous weed all over the area. No serious attempt has been made to work out the micro-species of this variable plant. The following segregates have, however, been noted.

C. BATAVORUM (E.At.) Wilm. V.-c. 17. South Croydon, 1926, *J.E.L.*; *Hb.L.* teste *C.E.B.*

C. DRUCEANA (E.At.) Wilm. V.-c. 16. Abbey Wood, 1918, *St.J.M.*; gravel-pit near Hayes, 1927, *F.G.S.*; *Hb.L.* V.-c. 17. Merton, 1918, *C.E.B.*; near Tolworth railway station, 1927, *J.E.L.*; *Hb.L.* det. *C.E.B.*

C. MEDITERRANEA (E.At.) Wilm. V.-c. 16. Gravel-pit, near Hayes, 1927, *F.G.S.*; *Hb.L.* teste *C.E.B.* V.-c. 17. Between Oxted and Titsey, 1927, *J.E.L.*; *Hb.L.* teste *C.E.B.*

C. PATAGONICA (E.At.) Wilm. V.-c. 17. Between Headley and Epsom Downs, 1926, *J.E.L.*; *Hb.L.* teste *E. Almquist.*

C. TREVIRORUM (E.At.) Wilm. V.-c. 16. Abbey Wood, 1925, *St.J.M.*; *B.E.C. 1925 Rep.*, 863 (1926).

C. TURONIENSIS (E.At.) Wilm. V.-c. 17. Between Riddelsdown and Hamsey Green, 1926; below Titsey Hill, 1927, *J.E.L.*; *Hb.L.* teste *E. Almquist.*

CORONOPUS Boehm.

C. DIDYMUS (L.) Sm. *Wart Cress.* Bare waste places and disturbed ground. Common and increasing in v.-cc. 16, 17, 20 and 21. No records for v.-cc. 18, 19 and 24.

C. SQUAMATUS (Forsk.) Aschers., C. PROCUMBENS Gilib. *Swine Cress.* Bare waste ground. Frequent and widely distributed.

LEPIDIUM L.

L. GRAMINIFOLIUM L. Alien. Europe. V.-c. 17. Bomb-crater, Brockham Hill, 1948, *J.E.L.*; *Hb.L.*

L. LATIFOLIUM L. *Dittander.* Alien. A native of salt-marshes now well naturalised in the Colne Valley. V.-c. 20. Rickmansworth, 1937; *P.H.C.* Abundant by the Colne near Springwell, *D.H.K.*; *Hb.K.* V.-c. 21. Abundant by the Colne at Springwell, *D.H.K.*; *Hb.K.* Canal side between Springwell and Harefield in several places, 1945; *B.W.* & *D.H.K.* V.-c. 24. By the Colne, Denham, 1946; *D.H.K.*

L. RUDERALE L. *Narrow-leaved Cress.* Waste ground, rubbish-tips and roadsides. Common and widely distributed, though unrecorded for v.-c. 19.

L. CAMPESTRE (L.) R.Br. *Field Pepper Wort.* Woods, cultivated and waste ground. Not common. V.-c. 16. Bickley, 1900; *L.B.H.* Hayes; *D.McC.* Cudham; Darenth Wood; Mounts Wood; *F.R.* V.-c. 17. Between Moorhouse and Titsey, 1914; *E.B.B.* Limpsfield, very local, 1923; *R.W.R.* Wimbledon Common; Ashtead; Headley to Walton; *P.H.C.* Streatham, 1927; Ham gravel-pits, 1931; Banstead Downs, 1933; Selsdon, 1932; Leatherhead Downs, 1942, *J.E.L.*; *Hb.L.* Chipstead, 1923; *W.W.* Carshalton, 1926, *E.C.W.*; *Hb.L.* V.-c. 18. Little Warley, 1907; Rainham, 1908; *P.H.C.* Coopersale; *C.N.* Near Hackney Marshes, 1950; *L.M.P.S.* V.-c. 20. Rickmansworth, 1950; *D.H.K.* V.-c. 21. Harefield, 1899; *E.M.D.*; 1946; *D.H.K.* Hayes, 1909; Uxbridge, 1913, *P.H.C.*; *Hb.L.N.H.S.* Hackney Marshes, 1913-15 and 1918; *J.E.C.* Hendon; Enfield; *P.H.C.* North Acton, 1921; *H.J.B.* Near Scratch

Wood, 1948; canal path between Hanwell and Southall, one plant, 1946; *B.W. & D.H.K.* Brentford, 1946; *D.H.K.* V.-c. 24. Langley, 1905, *L.B.H.*; *Hb.L.N.H.S.* Dromenagh, near Iver, 1921; *E.B.B.* The var. LONGISTYLUM (A. G. More) was found in v.-c. 21. Waste ground by the canal N. of Harefield Park, 1914, *L.J.T.*; *Hb.Mus.Brit.*

L. Smithii Hook. Dry banks and fields. Local. V.-c. 16. Near Romney Street, 1933; *P.H.C.* Hayes; West Wickham, 1938; *D.McC.* V.-c. 18. Epping; *L.B.H.* Chadwell; *P.H.C.* V.-c. 21. Near Uxbridge, 1922; *L.J.T.* Uxbridge Moor; Charlton; between Staines and Ashford; West Bedfont; *D.H.K.* Hounslow Heath, 1947; *H.B.*; 1949; *D.H.K.* Harefield, 1948; *B.W.* V.-c. 24. Abundant near Iver Heath; *C.S.N.*

L. PERFOLIATUM L. Alien. Europe. V.-c. 21. Hackney Marshes, 1923, *J.E.C.*; *Hb.Mus.Brit.*

L. SATIVUM L. Alien. Persia. V.-c. 16. Near Hayes, 1926, *F.G.S.*; Green Street Green near Farnborough, 1937, *J.E.L.*; *Hb.L.* Hayes Rectory, 1938; *D.McC.* V.-c. 17. Hackbridge, freely in an arable field, 1917; *P.H.C.* Near Carshalton, common in two arable fields, 1919; *L.J.T.* Possibly the two records refer to the same locality. V.-c. 18. Hale End, 1904, *C.N.*; *Hb.L.N.H.S.* Bentley; West Thurrock; *P.H.C.* V.-c. 20. Great Amwell; *P.H.C.* V.-c. 21. South Mimms; *P.H.C.* Rubbish-tips at Hanwell, Greenford, Dawley, Stonebridge and Chiswick; *D.H.K.*

L. VIRGINICUM L. Alien. N. America. V.-c. 18. Dagenham Dock, 1927; *J.E.C.* V.-c. 21. Muswell Hill, 1902; Hackney Marshes, 1914, *J.E.C.*; *Hb.Mus.Brit.* Yiewsley, 1927 *R.M.*; site of Twickenham Common, 1931, *J.E.L.*; *Hb.L.*

L. NEGLECTUM Thell. Alien. N. America. V.-c. 17. Rubbish-tip, Mortlake, 1949, *B.W.*; *Hb.W.* V.-c. 21. Rubbish-tip, Hanwell, 1946, *N.Y.S. & D.H.K.*; *Hb.K.* det. *N.Y.S.*; persisted until 1948; *D.H.K.* Rubbish-tip, Uxbridge Moor, 1948; *D.H.K.*

CARDARIA Desv.

C. Draba (L.) Desv., Lepidium Draba L. *Hoary Cress, Whitlow Pepper Wort.* Cultivated and waste ground, roadsides and railway banks. Common throughout the area. L. Draba L. var. SUBINTEGRIFOLIUM Mich. is recorded from v.-c. 17. Upper Warlingham, 1922, *J.E.L.*; *Hb.L.*

THLASPI L.

T. arvense L. *Field Penny Cress.* Cultivated and waste ground. Common and well distributed.

T. PERFOLIATUM L. *Perfoliate Penny Cress.* Alien. V.-c. 21. West Drayton, 1903, *T.A.D.*; *Hb.Druce.*

IBERIS L.

I. amara L. *Candytuft.* Bare chalky places. Very local. V.-c. 17. Slope above Headley Lane, abundant, 1935, *J.E.L.*; *Hb.L.* See *J. Bot.*, *74*, 197 (1936); still abundant, 1943; *J.E.L.*; 1949; *L.N.H.S. Excursion.* Bomb-crater, Brockham Hill, 1948, alien here; *J.E.L.*

TEESDALIA R.Br.

T. NUDICAULIS (L.) R.Br. Bare sandy places. Very rare. V.-c. 17. Near Weybridge, 1900, *L.B.H.*; *Hb.H.* East Ockham Common; *P.H.C.* Wimbledon Common, 1939; *P.H.C.*; 1946; *C.A.*; *J.E.L.* V.-c. 21. Dawley, 1907; *C.B.G.* Hounslow Heath, 1932; *A.W.W.*

ISATIS L.

I. TINCTORIA L. *Woad.* Alien. Europe. V.-c. 17. Bomb-crater, Brockham Hill, 1948, *J.E.L.*; *Hb.L.*

VOGELIA Medik.

V. PANICULATA (L.) Hornem. Alien. Europe. V.-c. 20. Totteridge, 1925, *J.E.C.* V.-c. 21. Crouch End, 1899; East Finchley, 1907; Church End, Finchley, 1922 and 1928, *J.E.C.*; *Hb.Mus.Brit.* Hackney Marshes, 1912-14 and 1924; Yiewsley, 1913; Temple Fortune, 1914; Hayes, 1916; *J.E.C.* Chiswick, 1943; *D.H.K.*

MYAGRUM L.

M. PERFOLIATUM L. Alien. Europe. V.-c. 21. Hackney Marshes, 1927, *J.E.C.*; *Hb.Mus.Brit.*

EUCLIDIUM R.Br.

E. SYRIACUM (L.) R.Br. Alien. W. Asia. V.-c. 17. Mortlake, 1916; *J.E.C.* V.-c. 21. Hackney Marshes, 1912, *J.E.C.*; *Hb.Mus.Brit.*

BUNIAS L.

B. ORIENTALIS L. Alien. S. Europe. Naturalised on waste ground, in chalky fields and on railway banks. Rare, but increasing. V.-c. 17. Putney, 1916; *J.E.C.* Thames bank near Sunbury Lock, 1942; hedge near Epsom Downs, 1941; near Selsdon Bird Sanctuary, abundant, 1941; chalk valley near Farleigh, a fine patch, 1943, since ploughed up, *J.E.L.*; *Hb.L.* Chelsea and Lambeth Reservoirs, Walton Road, 1946; *W.J.L.S.* Ham gravel-pits, 1950; *B.W.* det. *J.P.M.B.* V.-c. 18. Dagenham Dock, 1927, *R.M.*; widespread in the Barking district, 1945, *J.A.W.*; *Hb.L.* Chalk pit, Grays, 1949; *L.N.H.S. Excursion.* V.-c. 21. Hendon, 1912, *P.H.C.*; *Hb.L.N.H.S.* Near West Drayton, 1916-17; Yiewsley, 1917-20; *J.E.C.* Waste ground, Chiswick, 1942, *J.E.L.*; *Hb.L.*; abundant, 1950, *D.H.K.*; *Hb.K.* Isle of Dogs, abundant on a roadside, 1945; *J.A.W.* Railway bank near Southall, 1950, *B.W.*; *Hb.K.* Bombed site, Bunhill Row, E.C., 1951; *W.N.L. fide E.B.Ba.*

RAPISTRUM Crantz.

R. PERENNE (L.) All. Alien. Europe. V.-c. 21. Yiewsley, 1910; Finchley, 1912, *J.E.C.*; *Hb.Mus.Brit.* V.-c. 24. Near Uxbridge, 1912; *J.E.C.*

R. RUGOSUM (L.) All. Alien. Europe. Naturalised on waste ground, though in some places merely casual. Rare, but increasing. V.-c. 17. Beddington Lane dump, 1936, *P.H.C.*; *Hb.L.N.H.S.* Near Teddington Lock, 1930; by Grand Stand, Epsom Downs, 1932, *J.E.L.*; *Hb.L.* V.-c. 18. Rainham, 1927; *J.E.C.* Abundant on marshes between Rainham and Purfleet, 1935; *P.H.C.* V.-c. 21. Hackney Marshes, 1913, *J.E.C.*, *Hb.Mus.Brit.* Hillingdon gravel-pits, 1936; *P.H.C.* Hanwell, abundant and naturalised on waste ground, 1947-50, *D.H.K.*; *Hb.K.* Foot of Horsenden Hill, Greenford, 1947; West Drayton, 1948; *D.H.K.* Chiswick, 1949; *R.A.B. & D.H.K.* Yiewsley, 1934, *J.E.L.*; *Hb.L.*

R. ORIENTALE (L.) Crantz. Alien. S. Europe. In similar situations to the preceding of which it is a segregate from which the records cannot be clearly distinguished. Rare. V.-c. 16. Sea wall, Stone Marshes, thoroughly established, 1945, *J.E.L. & J.A.W.*; *Hb.L.* See *B.E.C. 1945 Rep.*, 153-154 (1947). V.-c. 21. West Drayton, 1906, *C.S.N.*; *Hb.L.N.H.S.*; 1949; *D.H.K.* Fortis Green, 1911; Hackney Marshes, 1912-13 and 1924, *J.E.C.*; *Hb.Mus.Brit.* Yiewsley, 1912-15; Muswell Hill, 1913; *J.E.C.* V.-c. 24. Near Iver, 1913; *J.E.C.*

RAPHANUS L.

R. RAPHANISTRUM L. *Wild Radish.* Cornfields, cultivated and waste ground. Common and widely distributed.

R. SATIVUS L. *Radish.* Alien. China. Not uncommon on tips and cultivated and waste ground as an escape from cultivation.

RESEDACEAE

RESEDA L.

R. ALBA L. *White Mignonette.* Alien. Europe. Garden escape. V.-c. 18. Railway bank near Woodford, 1929; *C.L.C.* V.-c. 21. Bombed site, Queens Elm, Brompton, 1945; *W.J.L.S.*; 1947; *B.W.*

R. LUTEA L. *Wild Mignonette.* Calcareous fields and downs, sandy places, railway banks and waste ground. Frequent and well distributed in v.-cc. 16, 17, 20 and 21. V.-c. 18. Thurrocks, 1909, *P.H.C.*; *Hb.L.N.H.S.* Epping railway station yard, 1931; Albert Dock, 1934; *P.H.C.* V.-c. 24. Denham; W. of Uxbridge; Iver; *D.H.K.*

R. LUTEOLA L. *Weld, Dyer's Rocket.* Waste ground and wall tops. Common and widely scattered.

CISTACEAE

HELIANTHEMUM Mill.

H. CHAMAECISTUS (L.) Mill., H. NUMMULARIUM (L.) Mill. *Rock Rose.* Calcareous downs, meadows, railway banks, etc. Locally abundant in v.-cc. 16 and 17. V.-c. 20. Rickmansworth, 1908; *P.H.C.* Sarratt, 1908, *P.H.C.*; *Hb.L.N.H.S.*; 1942; *D.H.K.* V.-c. 21. Chalk-pit under Garett Wood, Springwell, a fair patch, 1907; *C.B.G.* Now extinct in the county; *D.H.K.*

VIOLACEAE

VIOLA L.

Section I. NOMINIUM Ging.

The late P. M. Hall has named much of the material in *Herb. Lousley.*

V. ODORATA L. *Sweet Violet.* Wood borders, hedgebanks and railway banks. Local. V.-c. 16. Near Westerham; *R.W.R.* S. of Farningham; *F.R.* V.-c. 17. Near Richmond, towards Ham, by towpath, 1924; near Leatherhead; near Fetcham Park; *E.B.B.* Limpsfield Common; *R.W.R.* Ashtead Common; *C.L.W.* Tadworth to Chipstead; near Headley; *L.J.T.* Chalky bank near Fridley Copse; *J.E.L.* Downs above Oxted, local; *R.W.R.* Godstone; *P.H.C.* Richmond Park; Ham Common; Petersham Meadows, 1945-47; *B.W.* V.-c. 18. Nazeing; Stifford, *P.H.C.*; *Hb.L.N.H.S.* Hale End; *R.W.R.* Chingford; *J.O.B.* By Greensted Church; *L.J.T.* V.-c. 20. Waltham Abbey; *R.W.R.* Rickmansworth; *P.H.C.* Broxbourne; *E.M.D.* Bayford, *P.H.C.*; *Hb.L.N.H.S.* V.-c. 21. Towpath between Kingston Bridge and Hampton Court; Bentley Priory; Stanmore; near Denham Court; *L.J.T.* Harefield; Ickenham; New Years Green; Uxbridge Common; Pinner Hill; Ruislip Woods; Northwood; *D.H.K.* V.-c. 24. Near Fulmer; Denham; *D.H.K.*

var. SUBCARNEA (Jord.) Parl. V.-c. 16. Cudham; *W.W.*

var. DUMETORUM (Jord.) Rouy & Fouc. V.-c. 16. Chislehurst; Shoreham; *W.W.* Near Eynsford; *E.B.B.* N.E. of Otford; *L.J.T.* Near Westerham; *R.W.R.* Stone Castle, 1946; Farningham, 1949; *F.R.* V.-c. 17. Near Fetcham Pond; Limpsfield; *E.B.B.* Mickleham; *L.J.T.* Ham Common; *B.W.* V.-c. 18. Toothill, abundant in hedges; *J.O.B.* North Weald, 1951; *R.M.P.* V.-c. 20. Broxbourne; *E.M.D.* Beaumont Manor, *P.H.C.*; *Hb.L.N.H.S.* Waltham Abbey; *R.W.R.* V.-c. 21. Near Uxbridge Common, 1945; Hanwell Churchyard, 1945, *D.H.K.*; *Hb.K.* It is probable that some of these records refer to var. IMBERBIS Leight.—see characters given by S. M. Walters, *B.E.C. 1943-44 Rep.*, 834-839 (1946).

var. IMBERBIS Leight. V.-c. 16. Brasted Churchyard; *R.W.R.* S. of Farningham, 1949; *F.R.* V.-c. 20. Borders of Garett Wood, Springwell. V.-c. 21. Old Park Wood, Harefield; above Harefield Quarry, 1950, *D.H.K.*; *Hb.K.*

V. HIRTA L. *Hairy Violet.* Woods, rough pastures, downs and hedgebanks, chiefly on calcareous soils. Local. V.-c. 16. Abundant on the chalk. Sandy bank, Farningham Wood, 1949; *F.R.* V.-c. 17. Frequent on the chalk. Richmond Park; Ham Common; *B.W.* V.-c. 20. Croxley Mill; near Chandlers Cross; *C.S.N.* Sarratt; *P.H.C.* Wormley West End, *R.W.R.*; *Hb.L.N.H.S.* Sandy Lodge; *P.H.C.* Springwell; Rickmansworth, 1950; *D.H.K.* V.-c. 21. Common on the chalk at Springwell and Harefield; *D.H.K.* Whitchurch Common, 1906; *L.B.H.* Perivale Churchyard; *C.B.G.* Still there in 1934, but now lost; *D.H.K.*

Var. PROPERA (Jord.) Gillot. V.-c. 17. Box Hill, 1932, *J.E.L.*; *Hb.L.* teste *P.M.H.*

Var. FOUDRASII (Jord.) Rouy & Fouc. V.-c. 17. Box Hill, 1932, *J.E.L.*; *Hb.L.* teste *P.M.H.*

Var. LACTIFLORA Rchb. V.-c. 17. Fetcham Downs; Norbury Park, 1916; *E.B.B.*

×ODORATA. V.-c. 16. W. of Eynsford; Maplescombe, 1923; *W.W.* Shoreham, 1932, *J.E.L.*; *Hb.L.* teste *P.M.H.* V.-c. 17. Chalky bank near Fridley Copse, 1932, *J.E.L.*; *Hb.L.* teste *P.M.H.* Box Hill, 1950, *D.H.K.*; *Hb.K.* Probably much more frequent than the records suggest.

V. CALCAREA (Bab.) Greg. Calcareous grassy places. Rare. V.-c. 16. Maplescombe, near Eynsford; *W.W.* Hogstrough Hill, 1946; *F.R.* Biggin Hill, 1948; *B.W.* V.-c. 17. Betchworth, 1925; Box Hill, 1923, *J.E.L.*; *Hb.L.*; 1949; *L.N.H.S. Excursion.* Banstead Downs; Juniper Top, 1948; Juniper Bottom, 1949; Headley Lane, 1948; *B.W.*; 1949; *L.N.H.S. Excursion.* Down N. of Betchworth railway station, 1950; *B.W.*

V. PALUSTRIS L. *Marsh Violet.* Bogs. Rare. V.-c. 17. Black Pond, Esher Common; Oxshott Heath, 1915; *E.B.B.* Reigate Heath, 1921, *R.W.R.*; *Hb.R.*; 1925; *J.E.L.* Moorhouse, Limpsfield, 1923; *R.W.R.* V.-c. 21. Bog near Jack Straws Castle, West Heath, Hampstead; *C.S.N.* Extinct there before 1920; *D.H.K.* V.-c. 24. Black Park, 1899; *A.W.B.*; still abundant, 1950; *D.H.K.*

V. REICHENBACHIANA Jord. ex Bor., V. SYLVESTRIS auct. *Wood Violet.* Woods and hedgebanks, particularly on the chalk. Locally plentiful. V.-c. 16. Common and widely distributed. V.-c. 17. Frequent and well dispersed. V.-c. 18. Lambourne; *R.W.R.* V.-c. 19. Epping Lower Forest; *C.S.N.* V.-c. 20. Northaw; Rickmansworth; *P.H.C.* Garett Wood, and elsewhere about Springwell; *D.H.K.* V.-c. 21. Common in woods in the north-west parts of the county; *D.H.K.* Bedfont Churchyard, 1919; *L.J.T.* Not there now; *D.H.K.* Bishops Wood, Hampstead; Hadley; Scratch Wood, Edgwarebury; *D.H.K.* Finchley Golf Course, 1946; *J.E.L.* V.-c. 24. Black Park; Denham; *D.H.K.*

Forma PALLIDA Neum. V.-c. 21. Hedgebank near Jacks Lock, Harefield, with the type, 1950, *D.H.K.*; *Hb.K.*

Var. PUNCTATA (Rouy & Fouc.) Wilm. V.-c. 21. Ruislip Woods; Park Wood, Ickenham; Old Park Wood, Harefield; Scratch Wood, Edgwarebury; Gutteridge Wood, Northolt; *D.H.K.*

Forma LEUCANTHA Beck. V.-c. 16. Magpie Bottom; *W.W.* V.-c. 17. Devil's Den Wood, Coulsdon, 1924, *J.E.L.*; *Hb.L.*

×RIVINIANA. V.-c. 16. Magpie Bottom, 1932, *J.E.L.*; *Hb.L.* V.-c. 21. Mad Bess Wood, Ruislip, 1950, *D.H.K.*; *Hb.K.*

V. RIVINIANA Rchb. *Dark Wood Violet.* Woods, heaths, hedgebanks and railway banks. Common and widely distributed throughout the area.

Forma VILLOSA Neum. V.-c. 17. In shade of woods on downs above Limpsfield, 1917, *E.B.B.*; *Hb.B.* V.-c. 21. Ruislip Woods; Northwood, 1948; *D.H.K.*

Subsp. MINOR (Murb. ex Greg.) Valentine. V.-c. 17. Colley Hill, 1932, *J.E.L.*; *Hb.L.* teste *P.M.H.* V.-c. 21. Stanmore Common; Ruislip Common; Edgwarebury, 1948-49, *D.H.K.*; *Hb.K.*

Var. DIVERSA Greg. V.-c. 16. Crofton; *W.W.* V.-c. 17. Epsom Common; Mitcham Common, 1933, *J.E.L.*; *Hb.L.* teste *P.M.H.*

Var. VICINA (Martr.-Don). V.-c. 16. Kingsdown, 1929; *J.C.R.* V.-c. 17. Farleigh, 1929, *J.E.L.*; *Hb.L.* det. *P.M.H.* as f. NEMOROSA N.W. & M.

V. CANINA L. *Dog Violet.* Heaths and sandy places, also occasionally on the chalk. Local. V.-c. 16. Crockham Hill Common, 1913; *E.B.B.*; 1921; *R.W.R.* Hayes; *D.McC.* Dartford Heath, 1946; *F.R.* V.-c. 17. Richmond Park; Mickleham Downs; *L.J.T.* Bookham Common; *E.B.B.* Epsom and Limpsfield Commons; *R.W.R.* Mitcham Common; *L.P.* teste *J.E.L.* Banstead Common; *P.H.C.* Gravel-pit on Walton Heath; near Chelsham, *J.E.L.*; *Hb.L.* V.-c. 21. Stanmore Common; *C.S.N.* Hounslow Heath; *D.H.K.*

Var. ERICETORUM (Schrad.) Rchb. V.-c. 17. Mitcham Common, 1933, *J.E.L.*; *Hb.L.* teste *P.M.H.* Richmond Park, three places, 1944; Ham Common, 1945; *B.W.* Coulsdon Common; Worms Heath; Bull Green, Farleigh; *W.W.* V.-c. 20. Croxley Green, 1940; Moor Park, 1942; *D.H.K.* V.-c. 21. Ruislip Common; *C.B.G.*; 1950; *D.H.K.* Stanmore Common, 1944, *D.H.K.*; *Hb.K.* Ickenham Green, 1950; *D.H.K.*

Var. CALCAREA Rchb. V.-c. 17. Farthing Downs, Coulsdon, 1920; *W.W.*

Forma ALBA Greg. V.-c. 21. Ruislip Common, 1902, *C.B.G.*

×RIVINIANA. V.-c. 16. Between Crockham Hill Common and French Street, 1913; *E.B.B.* V.-c. 17. Limspfield Common, 1924; *R.W.R.*; *Hb.R.* Bookham Common, 1925; *E.B.B.* Epsom Common, 1927, *R.W.R.* Mitcham Common, 1930, *J.E.L.*; *Hb.L.* det. *P.M.H.* as V. RIVINIANA var. DIVERSA × CANINA var. ERICETORUM.

×LACTEA. V.-c. 17. Mitcham Common, 1930, *J.E.L.*; *Hb.L.* teste *P.M.H.* V.-c. 21. Hounslow Heath. 1947, *B.W.*; *Hb.K.* det. *J.E.L.* & *D.H.K.*, 1948, *D.H.K.*; *Hb.K.*

V. LACTEA Sm. Dry heaths. Very rare. V.-c. 17. Mitcham Common, c. 1930; *C.A.* teste *J.E.L.*

Section II. MELANIUM Ging.

The late E. Drabble determined a number of specimens in *Herb. Lousley*, and R. D. Meikle has named a few gatherings in *Herb. Kent.*

V. TRICOLOR L. *Heartsease, Wild Pansy.* Cornfields and cultivated and waste ground. Common and widely distributed. Under this species come:—

V. VARIATA Jord. V.-c. 16. Sundridge, 1933, *P.M.H.*; *Hb.L.*

Var. SULPHUREA Drabble. V.-c. 21. Harefield, 1944, *D.H.K.*; *Hb.K.* det. *R.D.M.*

V. LLOYDII Jord. V.-c. 16. Greenhithe; *W.W.*

Var. INSIGNIS Drabble. V.-c. 16. Sundridge, 1932, *J.E.L.*; *Hb.L.* teste *E.D.*

V. CONTEMPTA Jord. In similar situations to V. TRICOLOR. Possibly frequent, though its distribution has not yet been worked out. V.-c. 17. Sandy field, New Haw, 1932, *J.E.L.*; *Hb.L.* teste *E.D.* V.-c. 21. Chalk-pit, Harefield, 1919, *E.B.B.*; *Hb.Mus.Brit.* teste *E.D.*

V. ARVENSIS Murr. *Heartsease, Wild Pansy.* Cornfields, cultivated and waste ground. Common throughout the area. Under this species come:—

V. AGRESTIS Jord. V.-c. 17. Cornfield between Weybridge and New Haw, 1917; near Teddington Lock, 1924, *E.B.B.*; *Hb.B.* Ashtead, 1927, *C.E.B.*; near Addington, 1926, *J.E.L.*; *Hb.L.* det. *E.D.*

V. SEGETALIS Jord. V.-c. 17. Between Weybridge and New Haw, 1917, *E.B.B.*; *Hb.B.* Tot Hill, Headley, 1927, *J.E.L.*; Ashtead, 1929, *E.C.W.*; *Hb.L.* teste *E.D.*

V. LATIFOLIA Drabble. V.-c. 16. Sundridge, 1932, *J.E.L.*; *Hb.L.* teste *E.D.* V.-c. 17. Epsom Downs, 1929, *J.E.L.*; *Hb.L.* teste *E.D.*

V. RURALIS Jord. V.-c. 16. E. of Eynsford Church; *W.W.* V.-c. 17. W. of Coulsdon Common, 1920; Chipstead, 1923; *W.W.* Near Epsom Downs; near Croham Hurst, 1926, *J.E.L.*; *Hb.L.* teste *E.D.*

V. DESEGLISEI Jord. V.-c. 16. Near West Wickham railway station, 1926, *J.E.L.*; *Hb.L.* teste *E.D.*

Forma SUBTILIS (Jord.) Drabble. V.-c. 17. Banstead Downs, 1928, *E.C.W.*; *Hb.L.* teste *E.D.*

V. LEPIDA Jord. V.-c. 16. Knockholt, *S.E.C.*; *B.E.C. 1926 Rep.*, 194 (1927) teste *E.D.*

POLYGALACEAE

POLYGALA L.

P. VULGARIS L. *Common Milkwort.* Dry pastures, downs, heaths and banks, especially on the chalk. Locally common. V.-c. 16. Hayes, 1899, *L.B.H.*; *Hb.H.* Near Romney Street, 1929; *R.W.R.* Shoreham; Lullingstone, 1933; *P.H.C.* V.-c. 17. Downs above Oxted, 1914, *E.B.B.*; *Hb.B.* Park Downs, Chipstead, 1929, *R.W.R.*; *Hb.R.* Caterham; Buckland Hills, 1942, *J.E.L.*; *Hb.L.* V.-c. 21. Harefield, 1902, *R.W.R.*; *Hb.L.N.H.S.*; 1946, *D.H.K.*; *Hb.K.* Uxbridge; Springwell, 1944, *D.H.K.*; *Hb.K.* V.-c. 24. Near Denham, 1950; *D.H.K.*

P. OXYPTERA Rchb. Grassy places, perhaps mainly on the chalk. Apparently rare, but not adequately studied. V.-c. 16. Dartford Heath. *F.J.H.*; *Fl. Kent*, 49. V.-c. 17. Hurst Green, Oxted, local, 1922; *R.W.R.* Colley Hill, 1942; Chelsham Common, 1926 and 1943, *J.E.L.*; Banstead Heath, 1925, *C.E.B.*; *Hb.L.*

P. SERPYLLIFOLIA Hose. *Heath Milkwort.* Heaths, commons and moors, especially on acid soils. Locally frequent. V.-c. 16. Chislehurst; *W.W.* Near Westerham, 1924; *R.W.R.* Sidcup to Keston, 1931; *P.H.C.* Hayes, Keston, Dartford and Chislehurst Commons; *F.R.* V.-c. 17. Weybridge, 1900, *L.B.H.*; *Hb.H.* Ashtead; Epsom, 1935; *P.H.C.* Worms Heath; Limpsfield Common and Chart, 1917; *R.W.R.* Walton Heath, 1941, *J.E.L.*; *Hb.L.* Ham and Wimbledon Commons, 1946; *B.W.* V.-c. 18. Woodredon Hill; *R.W.R.* & *P.H.C.* Hainault Forest; *P.H.C.* Warley Common; *R.W.R.* V.-c. 20. Broxbourne; *C.S.N.* Bricket Wood, 1938; *R.W.R.* V.-c. 21. Stanmore Common; *L.B.H.*; 1949; Drayton Ford; Springwell; Harefield Moor; Ruislip and Harrow Weald Commons; Wyke Green; *D.H.K.* Grimsdyke, Harrow Weald, 1948, *B.W.* & *D.H.K.*; *Hb.K.*

P. CALCAREA F. W. Schultz. *Chalk Milkwort.* Chalk downs and old chalkpits. Locally abundant on North Downs. V.-c. 16. Downe; S.E. of Halstead; *W.W.* Orpington to Shoreham, 1931; *P.H.C.* Westerham Hill, 1938; *M.M.W.* Abundant from Biggin Hill eastwards to Shoreham and Otford Downs, but not on the chalk to the north; *F.R.* V.-c. 17. Reigate Hill, 1905, *C.S.N.*; *Hb.L.N.H.S.* Above Limpsfield, 1921; Riddlesdown, 1927; *R.W.R.* Farthing Downs, 1904; *P.H.C.*; 1942; Buckland Hills, 1942; Betchworth Lime Works, 1933; Banstead Downs, 1926; Brockham Warren, 1932; Quarry Hangers, 1942, *J.E.L.*; *Hb.L.* Box Hill, 1950; *D.H.K.*

P. AUSTRIACA Crantz. Chalk downs. Very rare. V.-c. 16. Magpie Bottom, 1936, *J.E.L.*; *Hb.L.*; 1940; *H.N.*

CARYOPHYLLACEAE

DIANTHUS L.

D. DELTOIDES L. *Maiden Pink.* Dry grassy places. Very rare. V.-c. 17. Chalky field and roadside near Chipstead, perhaps introduced, 1941, *J.E.L.*; *Hb.L.* Hurst Park Racecourse, 1949; *W.F.* Limpsfield Common; *P.H.C.* V.-c. 21. Precincts, Hampton Court Park, 1906, *C.B.G.*; *Hb.S.L.B.I.* Grassy bank, Wood End, no doubt introduced, 1940-48.

H.W.Pa.; *Hb.K.* Bombed site, Cheapside, E.C., deliberately introduced?; *W.F.*

D. ARMERIA L. *Deptford Pink.* Dry grassy places and wood borders. Very rare. V.-c. 16. Railway embankment, Orpington, 1944, *D.S.*, *R.W.H. & J.E.L.*; *Hb.L.* Near Farningham Wood, 1948; *R.A.B.* V.-c. 17. Field side near Croham Hurst, 1924, subsequently destroyed by building, *J.E.L.*; *Hb.L.* V.-c. 21. Wood near East Finchley, 1883; *J.E.C.* Parliament Hill Fields, 1941; *H.C.H.*

D. BARBATUS L. *Sweet William.* Alien. Europe. A garden escape, naturalised on chalky railway cuttings. Rare. V.-c. 16. Chalky railway cutting near Chelsfield, 1946; *D.H.K.* Chalk railway cuttings between Eynsford and Shoreham, 1949, *J.E.L.*; *Hb.L.* V.-c. 20. Roadside, North Mimms, several strong plants, 1921; *L.J.T.*

GYPSOPHILA L.

G. PANICULATA L. Alien. Europe. V.-c. 17. Ham gravel-pits, 1937; *P.H.C.* det. *Kew.*

G. VISCOSA Murray. Alien. Asia Minor. V.-c. 21. By canal, Denham, 1930; *P.H.C.* det. *Kew.*

G. ELEGANS M. Bieb. Alien. Asia Minor. V.-c. 21. Hackney Marshes, 1913; *J.E.C.* det. *Kew.*

SAPONARIA L.

S. OFFICINALIS L. *Soapwort.* Waste ground, hedgebanks and railway banks. Not uncommon. V.-c. 16. Hayes, 1936; *P.H.C.* Near Swanley Junction railway station, 1913; *L.J.T.* Near Stone Church, 1914; *C.L.W.* New Cross; *D.McC.* Stone; Darenth; Sutton-at-Hone; *H.M.P.* V.-c. 17. Railway bank, Bermondsey; Headley Lane, 1936; *P.H.C.* Limpsfield Common, 1938; *R.W.R.* Banstead Downs, 1930, *E.C.W.*; *Hb.L.* V.-c. 18. Near Dagenham, 1920; *L.B.H.* V.-c. 21. Railway bank, Clapton, 1910, *P.H.C.*; *Hb.L.N.H.S.* Railway embankment, Hackney, 1902; *J.E.G.* Near Hayes, *C.B.G.*; *Hb.S.L.B.I.* Roadside E. of Bedfont Church; *B.W.* Near St. Margarets; Childs Hill; near Hounslow Heath, abundant; near the Thames, Chiswick, abundant; *D.H.K.* By the railway, Willesden, 1948; *R.A.B.* Bombed sites near Wood Street, E.C., 1942-50; *J.E.L.* Bombed site, Cripplegate, *F.E.W.*; *Lond. Nat.*, *29*, 86 (1950). Double flowered plants are common where the typical species occurs in quantity.

VACCARIA Medik.

V. PYRAMIDATA Medik., SAPONARIA VACCARIA L. Alien. Europe. V.-c. 16. Cockerhurst, near Lullingstone, 1933; by Chelsfield railway station; *P.H.C.* V.-c. 17. Near Weybridge, 1899, *L.B.H.*; *Hb.H.* Baron's Walk, Mitcham, 1928, *J.E.W.*; *Hb.L.* V.-c. 18. Woodford Wells, casual in a garden, 1908; *C.L.C.* V.-c. 21. Uxbridge, 1905, *C.B.G.*; *Hb.S.L.B.I.* Crouch End, 1885; Finchley, 1907-9; North Finchley, 1925; Hackney Marshes, 1912-15 and 1924; Yiewsley, 1913-14 and 1923; *J.E.C.* Greenford, 1917, *J.E.C.*; *Hb.Mus.Brit.* V.-c. 24. Uxbridge, 1911; near Iver, 1917 and 1923; *J.E.C.*

SILENE L.

S. Cucubalus Wibel. *Bladder Campion.* Hedgebanks, cultivated and waste ground. Common and widely distributed. The var. hirsuta (S. F. Gray) is recorded from v.-c. 16. Near Westerham, 1924; *R.W.R.* V.-c. 17. Downs above Limpsfield, 1919; *R.W.R.* V.-c. 21. Harefield; Hounslow; *D.H.K.* A plant with pink flowers was gathered at v.-c. 21. Muswell Hill, 1913; *J.E.C.*

S. maritima (Hornem.) With. *Sea Campion.* Alien. V.-c. 17. Rubbish heaps. Wimbledon Common. 1946, *J.E.L.; Hb.L.*

S. anglica L. *English Catchfly.* Cornfields, cultivated and waste ground. Very rare, and often only casual. V.-c. 16. Spring Park Wood, 1926; West Wickham, 1927, *F.G.S.*; *Hb.L.* V.-c. 17. Limpsfield Common, one plant, 1922; *R.W.R.* Roadside, Reigate Heath; *B.M.C.M.* Barnes Common, one plant, 1951; *L.N.H.S. Excursion.* V.-c. 18. Gravel pit, Purfleet, 1935; *P.H.C.* V.-c. 21. Yiewsley, 1908, *J.E.C.*; *Hb.Mus.Brit.* Finchley, 1909-10; Hackney Marshes, 1913-15; Hendon. 1915; North Finchley, 1925; *J.E.C.*

S. gallica L. Alien. Europe. V.-c. 16. Hayes Old Rectory, 1936-38; *D.McC.*

S. nutans L. *Nottingham Catchfly.* Grassy places. Very rare. V.-c. 16. Lessness Abbey, 1948; *R.A.B.* V.-c. 17. Ham, near Teddington Lock, 1920, *L.B.H.*; *Hb.H.*; 1923, *H.J.B.*; *Hb.B.*; 1944; *L.N.H.S. Excursion*; 1948; *D.H.K.*

S. italica (L.) Pers. *Italian Catchfly.* Dry banks. Very local. V.-c. 16. Galley Hill, Greenhithe, 1931, *J.E.L.*; *Hb.L.* Seen in plenty at intervals, 1931-49; *J.E.L.*

S. conoidea L. Alien. E. Europe. V.-c. 21. Hackney Marshes, 1912; *J.E.C.*

S. dichotoma Ehrh. Alien. Europe. V.-c. 17. Cornfield between Banstead and Epsom Downs, 1943 or 1944, *J.G.M.* det. *J.E.L.*: *Watsonia*, *1*, 240 (1950). V.-c. 21. Hackney Marshes, 1912 and 1916, *J.E.C.*: *Hb.Mus.Brit.*

LYCHNIS L.

L. Flos-cuculi L. *Ragged Robin.* Streamsides, marshes and wet woods. Common and well distributed. The subvar. albiflora Peterm. is reported from v.-c. 21. Colne banks, Harefield and Staines Moor, 1944; *D.H.K.*

L. chalcedonica L. Alien. Europe. Garden escape. V.-c. 21. Wood near Harefield. 1902, *R.W.R.; Hb.R.*

L. Coronaria (L.) Desr. Alien. Europe. Garden escape. V.-c. 16. Old chalk-pit, Green Street Green, 1937, *J.E.L.*: *Hb.L.* V.-c. 17. Limpsfield Common. *R.W.R.*: *Lond. Nat.*, *19*, 25 (1940). V.-c. 21. Bombed site. Red Lion Passage, W.C.1., 1942-50; *J.W.* Bombed site, Cripplegate. *F.E.W.*; *Lond. Nat.*, *29*, 86 (1950).

MELANDRIUM Roehl.

M. NOCTIFLORUM (L.) Fries., SILENE NOCTIFLORA L. *Night-flowering Catchfly.* Cornfields, cultivated and waste ground, particularly on light soils. Rare and often only casual. V.-c. 16. Dartford, 1930; *P.H.C.* V.-c. 17. Mortlake, 1917 and 1921; *J.E.C.* Limpsfield, 1924, *R.W.R.*; *Hb.B.* Near Leatherhead, 1932; *P.H.C.* V.-c. 18. Woodford Green, several plants, 1905; *C.N.* Noak Hill, 1912, *P.H.C.*; *Hb.L.N.H.S.* V.-c. 20. Gravel-pit, Broxbourne, 1903, *C.S.N.*; *Hb.L.N.H.S.* V.-c. 21. Crouch End, 1897; Muswell Hill, 1902, *J.E.C.*; *Hb.Mus.Brit.* Yiewsley, 1909 and 1913; Hackney Marshes, 1913 and 1924; *J.E.C.* Garden weed, Ealing, 1948; *M.E.C.* teste *B.W.* Bombed site by Mark Lane, 1948; *R.A.G.*; *J.E.L.*; *Hb.L.* Rubbish-tip, Hanwell, 1950; *D.H.K.* Railway bank between Yeoveney and Poyle, 1951, *D.H.K.*; *Hb.K.*

M. ALBUM (Mill.) Garcke., LYCHNIS ALBA Mill. *White* or *Evening Campion.* Cultivated and waste ground, roadsides and railway banks. Common and well distributed throughout the area. The var. VISCOSUM (F. Aresch.) Ahlf. is recorded from v.-c. 17. Ham gravel-pits and v.-c. 21. Waste ground by the Thames, Chiswick, 1942 and 1945, *N.Y.S.*; *Hb.Kew.* The Chiswick station has since been destroyed. See *The Naturalist, April-June 1948*, p. 45, and *April-June 1949*, p. 47.

× DIOICUM. V.-c. 21. Carville Park, Brentford, 1944; *B.W.* Near Northolt, 1944; *D.H.K.* This hybrid is possibly more frequent than the records suggest.

M. DIOICUM (L.) Coss. & Germ., M. RUBRUM (Weig.) Garcke., LYCHNIS DIOICA L. *Red Campion.* Woods, thickets and shady banks. Frequent and widely distributed.

AGROSTEMMA L.

A. GITHAGO L., LYCHNIS GITHAGO (L.) Scop. *Corn Cockle.* Cornfields, cultivated and waste ground. Formerly common, but now quite scarce and usually adventive. V.-c. 16. Near Dartford; *P.H.C.* Green Street Green, 1946; *F.R.* V.-c. 17. Cornfields, Leatherhead and Mickleham, 1919, *E.B.B.*; *Hb.B.* Tot Hill, Headley, 1932, *J.E.L.*; *Hb.L.* Walton Heath: *J.H.G.P.* In two cornfields between Riddlesdown and Hamsey Green, 1951; *J.D.L.* V.-c. 18. Cornfields, Chingford, 1905; *J.O.B.* Woodford Green, 1905; *C.N.* West Thurrock, 1905; *L.B.H.* Grays; *P.H.C.* V.-c. 20. Near West Hyde; *P.H.C.* Near London Colney, 1908; *L.J.T.* Near Essendon, 1920; *P.H.C.* Broxbourne; *L.B.H.* V.-c. 21. Numerous old records. Greenford, 1938; rubbish-tip, Hanwell, 1944-50; Harefield; Springwell, 1944-46; *D.H.K.* Among crops, Ken Wood, 1949; *B.W.*, *H.C.H. & D.H.K.* V.-c. 24. Near Langley; *L.B.H.* Iver, 1909, *P.H.C.*; *Hb.L.N.H.S.*

CERASTIUM L.

C. PUMILUM Curt. Bare chalky places and railway tracks. Very local. V.-c. 17. Banstead Downs, in plenty on chalky rubble thrown up from the railway cutting, 1933, *J.E.L.*; *Hb.L.*; seen at intervals, 1934-50; *J.E.L.* V.-c. 21. Railway bank near Mill Hill, 1951; *E.M.R.* & *J.G.D.* Adventive here; *D.H.K.*

C. SEMIDECANDRUM L. Heathy and turfy places on sandy and calcareous soils. Local. V.-c. 16. Chislehurst; *W.W.* Wall, West Wickham, 1926, *J.E.L.*; *Hb.L.* Keston, 1946; *P.H.C.*; *F.R.* Hayes, 1946; *F.R.* V.-c. 17. Tow-path S. of Richmond, not uncommon, 1924; Oxshott Heath, 1925; *E.B.B.* Limpsfield Common, 1922 and 1939; *R.W.R.* Reigate Heath, 1931, *J.E.L.*; *Hb.L.* Banstead Downs, 1946; *L.N.H.S. Excursion.* Richmond Park, 1950; *B.W.* V.-c. 21. Towing-path near Hampton Court, 1926, *J.E.L.*; *Hb.L.*; 1950; *D.H.K.* Ken Wood; *R.S.R.F.* Hounslow Heath, 1935-50, *D.H.K.*; *Hb.K.* Heathy waste ground between Ashford Common and Staines, 1950; *D.H.K.*

C. TETRANDRUM Curt. Railway tracks. Very local, or overlooked. V.-c. 21. Plentifully between the metals of the main line by Scratch Wood Sidings, near Edgwarebury, 1951, *J.G.D.*; *Hb.K.*

C. VISCOSUM L., C. GLOMERATUM Thuill. Heaths, wall tops, wood and rides, fields and dry places. Common and well distributed. An apetalous form was found in v.-c. 21. Near Ashford Common, 1950; *D.H.K.* det. *J.K.M.*

C. VULGATUM L., C. TRIVIALE Link. *Common Mouse-ear Chickweed.* Heaths, wall tops, woodland rides, fields, cultivated and waste ground. Frequent and widely distributed The var. HOLOSTEOIDES Fries. was found in v.-c. 17. Thames bank between Kew and Richmond, *J.E.L.*; *Hb.L.*

C. ARVENSE L. *Field Mouse-ear Chickweed.* Grassy places on sandy and calcareous soils. Local. V.-c. 16. Keston, 1926, *J.E.L.*; *Hb.L.* Between Limpsfield and Westerham; Orpington by-pass, 1931; Westerham, 1942; *P.H.C.* Horns Cross, Stone; *H.M.P.* teste *F.R.* S. of Greenhithe, 1946; *F.R.* V.-c. 17. Ham, 1923, *H.J.B.*; *Hb.B.* Chipstead, 1923; *W.W.* Worms Heath, very local, 1919; near Limpsfield, local, 1923; Riddlesdown, 1928; *R.W.R.* Stoats Nest; *P.H.C.* Tot Hill, Headley, 1922; Banstead Downs, 1926; *J.E.L.* Woodcote Park, 1930, *E.C.W.*; *Hb.L.* Wimbledon Common, 1945, probably adventive; *B.W.* Tow-path near Teddington, 1948; *R.A.B.* V.-c. 18. Hainault Forest, 1908, *P.H.C.*; *Hb.L.N.H.S.* V.-c. 21. Teddington, 1936; roadside between Ashford Common and Staines, 1950; near Hampton Court, 1936; *D.H.K.* Hounslow Heath, abundant; *A.W.W.*; 1948; *D.B.* teste *B.W.*

C. TOMENTOSUM L. *Snow-in-Summer.* Alien. Europe. Garden escape. V.-c. 17. Banstead Downs, 1946; *L.N.H.S. Excursion.* V.-c. 21. Waste land near the Thames, Chiswick, 1946, *D.H.K.*; *Hb.K.* Bombed site, Cripplegate, *F.E.W.*; *Lond. Nat.*, 29, 86 (1950).

MOENCHIA Ehrh.

M. ERECTA (L.) Gaertn. Mey. & Scherb. *Upright Chickweed.* Heaths, commons and turfy places on sandy and gravelly soils. Local. V.-c. 16. Pauls Cray Common, *F.J.H.*; *Fl. Kent*, 59. Hayes Common, 1938 and 1946; *D.McC.* Crockham Hill, 1923; Keston; Dartford Heath; *R.W.R.* V.-c. 17. Limpsfield Chart, local; *C.L.W.* Limpsfield Common, very local, 1929; *R.W.R.*; 1939; *P.H.C.* Mitcham Common, 1924, *J.E.L.*; *Hb.L.*; 1937; *L.P.* teste *J.E.L.* Reigate Heath, 1931, *J.E.L.*; *Hb.L.*; 1950; *B.M.C.M.* Epsom Common, 1935; *P.H.C.* V.-c. 19. Nazeing Common, 1915; *C.N.* V.-c. 21. Whitchurch Common, 1902, *C.S.N.*; *Hb.L.N.H.S.* Ruislip Common, 1936; Hounslow Heath, 1935; Uxbridge Common, very local, 1940; *D.H.K.* Hampton Court Park, locally abundant on golf course, 1945; *B.W.*; 1950; *L.N.H.S. Excursion.* Bushy Park, 1949; near Staines, 1950, *D.H.K.*; *Hb.K.*

STELLARIA L.

S. MEDIA (L.) Vill. *Common Chickweed.* Fields, hedgebanks, woods, cultivated and waste ground, etc. Abundant everywhere.

S. APETALA Ucria., S. PALLIDA (Dum.) Pire. Grassy places and wall tops. Rare, or overlooked. V.-c. 16. Pauls Cray Common; *W.W.* V.-c. 17. Richmond Park, 1947; *B.W.* Near Golf Course, Wimbledon, 1949; *R.A.B.* V.-c. 21. Harefield, *D.H.K.*; *Hb.K.* Hampton Court, abundant, 1945; *F.R.*; 1950; *D.H.K.* Hounslow Heath; Isleworth; Hanwell; Syon and Osterley Parks, 1944-49; *D.H.K.*

S. NEGLECTA Weihe. Woods and shady places. Local, or overlooked. V.-c. 16. Darenth; *W.W.*; wet copse, by church, 1945; *F.R.* V.-c. 17. Reigate Heath, 1929; Wimbledon Common, 1943, *J.E.L.*; *Hb.L.* N.E. of Redhill railway station, 1950; *B.M.C.M.* V.-c. 21. Harefield; Uxbridge; Cowley; Shepperton; Hanwell, 1944-49; *D.H.K.* West Heath, Hampstead, 1949; *E.C.W.*, *F.R.*, *R.A.B.* & *D.H.K.* North-west Heath, Hampstead, 1949; *D.H.K.*

S. HOLOSTEA L. *Greater Stitchwort.* Wood borders, shady hedgebanks and heaths. Common and well distributed. The var. APETALA (Rostrup ex) Asch. & Graebn. is recorded from v.-c. 24. Roadbank near Rush Green, 1950, *D.H.K.*; *Hb.K.* and the var. LOUSLEYI (Druce) Brenan & Lousley from V.-c. 17. Roadside near Woldingham, 1927, *J.E.L.*; *Hb.L.*

S. DILLENIANA Moench. *Marsh Stitchwort.* Bogs. Rare. V.-c. 21. Near Walton Bridge, 1928, *E.C.W.*; *Hb.L.*; 1946, *D.H.K.*; *Hb.K.* The var. PALUSTRIS (Retz.) Druce is reported from v.-c. 17. Near Weybridge, 1901, *L.B.H.*; *Hb.H.*; 1932, *J.E.L.*; *Hb.L.* New Haw Lock, near Addlestone, 1917; *E.B.B.* V.-c. 21. Shortwood Common, Staines, very local, 1946; near Walton Bridge, abundant, 1946, *D.H.K.*; *Hb.K.*

S. GRAMINEA L. *Lesser Stitchwort.* Grassy places, heaths, commons and woodland clearings. Common and well distributed. The var. GRANDIFLORA Peterm. was found in v.-c. 21. Copse Wood, Northwood, 1947, *D.H.K.*; *Hb.K.*, and a plant with entire instead of cleft petals was gathered at v.-c. 17. Epsom Common, 1946; *W.M.*

S. ALSINE Grimm., S. ULIGINOSA Murr. *Bog Stitchwort.* Bogs, wet places and brook sides. Locally abundant. V.-c. 16. Pauls Cray Common; *W.W.* Keston Bog, 1923, *J.E.L.*; *Hb.L.*; 1949; *F.R.* Bostall and Lessness Woods; *P.H.C.* V.-c. 17. Between Weybridge and New Haw, 1917; Bookham Common, 1919; Oxshott, 1925; *E.B.B.* Abrook; Wimbledon Common; *W.W.*; 1943; Richmond Park, 1943; *B.W.* Limpsfield, local; *R.W.R.* Coulsdon Common, 1935; *P.H.C.* V.-c. 18. High Beech, 1900, *R.W.R.*; *Hb.L.N.H.S.* Woodredon Hill; Lambourne; *R.W.R.* Cuckoo Pits, Epping Forest, *J.H.G.P* & *J.R.*; *Lond. Nat.*, *24*, 45 (1945). Theydon Bois; Purfleet, 1935; *P.H.C.* V.-c. 19. Epping Lower Forest, 1951; *L.N.H.S. Excursion.* V.-c. 20. Totteridge Green; High Barnet; *C.S.N.* V.-c. 21. Harlington, 1923; *H.J.B.* Coldfall Wood, Highgate; *E.M.D.* Bishops Wood; Hadley Common; *C.S.N.*; 1947; *D.H.K.* Ruislip Woods; Harrow Weald and Stanmore Commons; Harefield; East Heath, Hampstead; Parliament Hill Fields; Ken Wood, 1939-49; *D.H.K.* South Mimms; Highgate Woods; *C.S.N.* V.-c. 24. Black Park, 1936; *P.H.C.*; 1950; *D.H.K.* Denham, 1934, *P.H.C.*; *Hb.L.N.H.S.*

MYOSOTON Moench.

M. AQUATICUM (L.) Moench., MALACHIUM AQUATICUM (L.) Fries., STELLARIA AQUATICA (L.) Scop. *Water Chickweed.* Stream sides, marshes and wet woods. Rather common. V.-c. 16. Crofton; near Sidcup; *W.W.* River Darent from South Darenth to Dartford, 1950; *H.M.P.* V.-c. 17. Many scattered records by the Thames from Chertsey to Kew. By the Mole S. of Cobham, 1950; *B.W.* Dry bed of the Mole, Norbury Park, 1934; *R.W.R.* V.-c. 18. Silver Street; Chigwell; *P.H.C.* Near Romford, 1913, *P.H.C.*; *Hb.L.N.H.S.* Brook near Chingford, 1935; *J.R.* Stanford Rivers, 1937; *P.H.C.* V.-c. 20. Rickmansworth, 1912, *C.S.N.*; *Hb.L.N.H.S.* Frequent in the Colne Valley from Watford to Springwell, 1950; *D.H.K.* Amwell Bury, 1909, *P.H.C.*; *Hb.L.N.H.S.* Lea at Broxbourne; *C.S.N.* V.-c. 21. Frequent by the Colne from Springwell to Staines, and by the Thames from Staines to Hampton Court; common by the Brent from Greenford to Hanwell; Edmonton; Long Wood, Wyke Green; *D.H.K.* Dollis Brook, Finchley; *L.B.H.* Enfield, 1913, *P.H.C.*; *Hb.L.N.H.S.* Northwood; *B.W.* Bombed site near Holborn, 1950; *J.W.* V.-c. 24. Colnbrook; near Horton; *C.S.N.* Denham; Iver; *D.H.K.*

ARENARIA L.

A. SERPYLLIFOLIA L. *Thyme-leaved Sandwort.* Downs, walls, cultivated and waste ground. Common and well distributed.

A. leptoclados (Rchb.) Guss. Walls, cultivated and waste ground. Probably common, but often confused with the previous species. V.-c. 16. Chislehurst; Bickley; *W.W.* Hayes; Beckenham, 1926, *F.G.S.*; *Hb.L.* Old farm walls, Abbey Wood, 1930; *R.W.R.* V.-c. 17. Box Hill, 1916; *L.J.T.* Mickleham, 1919; *E.B.B.* Kingswood, 1926; near Selsdon, 1927, *J.E.L.*; *Hb.L.* Limpsfield, local, 1922; *R.W.R.* Mitcham Common; *C.I.P.* V.-c. 20. Broxbourne; *L.B.H.* V.-c. 21. Frequent and well distributed, e.g. Ken Wood; Regents Park, etc.; *D.H.K.*

MOEHRINGIA L.

M. trinervia (L.) Clairv. *Three-nerved Sandwort.* Wood borders and hedge banks. Common and well distributed.

MINUARTIA L.

M. tenuifolia (L.) Hiern., Arenaria tenuifolia L. *Fine-leaved Sandwort.* Dry banks on calcareous soils and on railway tracks. Very rare. V.-c. 17. Banstead Downs, 1933, *J.E.L.*; *Hb.L.*; 1941; *C.I.P.*; 1946; *L.N.H.S. Excursion.* V.-c. 21. Railway track between Denham and Uxbridge, 1951, *D.H.K.*; *Hb.K.*

HONCKENYA Ehrh.

H. peploides (L.) Ehrh., Arenaria peploides L. *Sea Purslane.* Salt marshes. Very rare. V.-c. 18. Grays, 1909, *P.H.C.*; *Hb.L.N.H.S.*

SAGINA L.

S. apetala Ard. *Annual Pearlwort.* Bare stony places, walls and garden paths. Probably common. V.-c. 17. Limpsfield, on wall of Manor House, rare, 1923; *R.W.R.* Ham Gate, Richmond Park; *P.H.C.* Near Reigate Heath, 1930, *E.C.W.*; Crown Lane, Streatham, 1942, *J.E.L.*; *Hb.L.* Ashtead, 1940; *P.H.C.* V.-c. 18. Ongar, 1937; *P.H.C.* V.-c. 20. Oakleigh Park, Barnet, 1923; *R.W.R.* Bricket Wood; Broxbourne; *P.H.C.* V.-c. 21. Common and widespread. V.-c. 24. Walls, Fulmer, 1924; *E.B.B.* Denham Village, 1950; *D.H.K.*

S. filicaulis Jord. In a sandpit. Very rare, or overlooked. V.-c. 17. Buckland, 1950; *B.M.C.M.* det. *J.E.L.*

S. ciliata Fries. *Fringed Pearlwort.* Bare sandy places, heaths and walls. Local, or overlooked. V.-c. 16. Chislehurst; Crofton; *W.W.* Hayes and Keston Commons; Farningham Wood borders; Lane End, near Darenth; *F.R.* V.-c. 17. Chelsham, 1925, *J.E.L.*; *Hb.L.* Richmond Park; by tow-path, Ham, 1950; *B.W.* Churchyard wall, Cobham, 1950; *L.N.H.S. Excursion.* Reigate Heath; *B.M.C.M.* V.-c. 21 Tow-path near Hampton Court, 1945, *D.H.K.*; *Hb.K.* Bombed site near Tower of London, 1945; *F.R.* Hounslow Heath, 1948; *A.W.W.* Grounds of Swakeleys House, 1950; railway tracks, Staines and Colnbrook, 1951; *D.H.K.*

S. PROCUMBENS L. *Procumbent Pearlwort.* Walls, garden paths, bare waste ground, etc. Common and widely distributed.

S. NODOSA (L.) Fenzl. *Knotted Pearlwort.* Bare places. Very rare. V.-c. 17. Banstead Downs; *W.W.*

[S. SUBULATA (Sw.) C. Presl has not been noticed within the area by members but there are old records for v.-c. 17, and it should be looked for especially in sandy and gravelly places about Esher and Oxshott.]

SPERGULA L.

S. ARVENSIS L. *Corn Spurrey.* Cultivated ground, especially on sandy soils. Common and widely distributed, though unrecorded for v.-c. 19.

S. SATIVA Boenn. *Corn Spurrey.* In similar situations to the preceding species. Probably common, though not sufficiently studied. V.-c. 16. Knockholt, 1941; *P.H.C.* V.-c. 17. Headley Lane, 1900, *C.S.N.*; *Hb.L.N.H.S.* Chelsham, 1923, *J.E.L.*; *Hb.L.* Ashtead, 1939; Ham gravel-pits, 1941; *P.H.C.* V.-c. 20. Springwell, 1948; *D.H.K.* V.-c. 21. Harefield, 1922; *L.J.T.* teste *L.B.H.* Uxbridge; between Kingston Bridge and Hampton Court; rubbish-tip, Hanwell; Osterley, 1939-50; *D.H.K.* Springwell, 1948, *D.H.K.*; *Hb.K.*

SPERGULARIA Presl.

S. RUBRA (L.) J. & C. Presl. *Red Sand Spurrey.* Heathy and sandy places. Rather common, and well distributed throughout the area.

S. SALINA J. & C. Presl. Salt marshes. Rare. V.-c. 18. West Thurrock, 1904, *C.S.N.*; Grays, 1909, *P.H.C.*; *Hb.L.N.H.S.* The var. NEGLECTA (Kindb.) Druce is recorded from v.-c. 16. River bank, Erith Marshes, 1927; *H.J.B.* V.-c. 21. Rubbish-tip, Hanwell, one large plant, probably introduced with shingle ballast, 1950, *D.H.K.*; *Hb.K.*

S. MARGINATA (DC.) Kittel, S. MEDIA (Pers.) Presl. Salt marshes. Rare. V.-c. 16. Swanscombe Marsh, 1946; *D.H.K.* Crayford Ness, 1949; *F.R.*

PORTULACACEAE

PORTULACA L.

P. OLERACEA L. Alien. Europe. V.-c. 17. Rubbish-tip, Mortlake, 1944, *B.W.*; *Hb.W.*

CLAYTONIA L.

C. ALSINOIDES Sims, MONTIA SIBIRICA (L.) Howell. Alien. A species of western North America, now well naturalised in woods and damp shady places. Not common. V.-c. 17. Limpsfield, a large patch in a fir wood in the grounds of St. Michael's School, 1936, *R.W.R.*; *Hb.R.*;

1939; *P.H.C.* Limpsfield Common, locally abundant, *R.W.R.*; *Lond. Nat.*, *19*, 25 (1940). V.-c. 18. Established on the bank of the Ching brook, Whitehall Plain, Epping Forest, 1933; *J.R.* V.-c. 21. Turners Wood, Hampstead, 1945; *R.S.R.F.* North-west Heath, Hampstead, abundant in two places; Hampstead Heath Extension, 1947; *H.C.H.*; 1948, *D.H.K.*; *Hb.K.* Hanger Hill, Ealing, 1945; *F.P.D.B.* Shepherds Hill, Harefield, 1948; *D.H.K.*

C. perfoliata Willd., Montia perfoliata (Donn.) Howell. Alien. A native of western North America, originally believed to have been introduced with Rhododendrons and now naturalised and locally abundant on heaths, by roadsides and on cultivated ground, particularly on sandy soils. V.-c. 16. Hayes Common, 1922, *J.E.L.*; *Hb.L.*; 1938; *D.McC.* Montreal Park, Riverhead; *H.S.F.* teste *F.R.* Bessel's Green, 1949; *F.R.* V.-c. 17. Weybridge, 1900, *L.B.H.*; *Hb.H.*; 1919; *E.B.B.*; 1932; *P.H.C.* Roehampton, 1930; *H.J.B.* Weed in flower beds, Kew Gardens, 1936; *P.H.C.*; still abundant, 1950; *B.W.* Burford Park, near Walton, 1936; *P.H.C.* Wimbledon Common, 1939; *P.H.C.*; 1946; *B.W.* Ham Common, 1943; *B.W.*; 1949, scarce; *R.A.B.* Richmond Park, 1946; *B.W.* Reigate Hill, 1940; *H.N.* Reigate Heath, 1950; *B.M.C.M.* V.-c. 18. Near Paul's Nursery, Loughton, 1912; *P.H.C.*; 1934; *B.T.W.*; 1935; *J.R.* Roadside near Dudbrook, 1928; *B.T.W.* V.-c. 21. Stanmore; *A.L.* Weed in flower beds, Hanger Hill Park, Ealing, 1946; *F.P.D.B. & D.H.K.* Cockfosters; *E.M.A.* Hampstead Heath Extension, rare, 1949; *H.C.H.* West Heath, Hampstead, rare, 1949; *D.H.K.* Northwood, 1950; *R.A.G.*

MONTIA L.

M. fontana L. sensu lato. *Blinks.* Wet heathy places. Local. V.-c. 16. Chislehurst Common; *W.W.* Moorhouse, Limpsfield; *R.W.R.* Formerly on lawn at Hayes Old Rectory; *D.McC.* Dartford Heath, on dry sandy turf, 1946; *F.R.* V.-c. 17. Bookham Common, 1940; *P.H.C.* Ham Common, 1946; Richmond Park, 1949; *B.W.* V.-c. 18. Chingford; *E.M.D.* High Beech, 1910, *P.H.C.*; *Hb.L.N.H.S.* V.-c. 19. Epping Lower Forest; *C.S.N.* V.-c. 20. Elstree Reservoir, 1902; *L.B.H.* Batchworth Heath; *C.S.N.* V.-c. 21. Elstree Reservoir, 1902; *L.B.H.* Whitchurch Common; *H.S.* Hounslow Heath, 1938; near Walton Bridge, 1944; Stanmore Common; Staines Moor, 1945; *D.H.K.* South Mimms, 1946; Hampton Court Park; *B.W.* Hadley Common; *C.S.N.*; 1946; *D.H.K.*

This genus is in course of revision by S. M. Walters. He has identified M. lusitanica Sampaio from v.-c. 17. Mitcham Common, 1930, *J.E.L.*; *Hb.L.*, and M. verna Neck. from v.-c. 17. Epsom Common, 1930, *J.E.L.*; *Hb.L.* These will be given in new combinations, probably as subspecies of M. fontana L. in his forthcoming paper.

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